THE IDEAL FITTER

AMERICAN RADIATOR COMPANY

The Ideal Fitter

Prices herein quoted supersede all former lists and are subject to change without notice

AMERICAN RADIATOR COMPANY

General Offices: CHICAGO

BOSTON	44 Oliver Street
NEW YORK	42-44 East Twentieth Street
PHILADELPHIA	622 Arch Street
BUFFALO	1741 Elmwood Avenue
ST. LOUIS	207-209 North Tenth Street
MINNEAPOLIS	204 Fourth Street, South
DENVER	831 Fifteenth Street

Index

Boilers

Radiators

Specialties

Miscellaneous

The Ideal Fitter

THE IDEAL FITTER demands ideal goods to do ideal work. Each and every article shown herein has been made or selected by us with that end in view. We are therefore confident the Boilers, Radiators and Specialties offered will appeal convincingly to the judgment and self-interest of all who prefer to use the best.

We especially invite attention to our new types of Boilers and Radiators — fully abreast with and leading the times.

With our immense factories, many branch warehouses, and large force of traveling salesmen, we are equipped as no house ever was to give most valuable and prompt service to all alike *and at all times.* We solicit a trial — no order is too small.

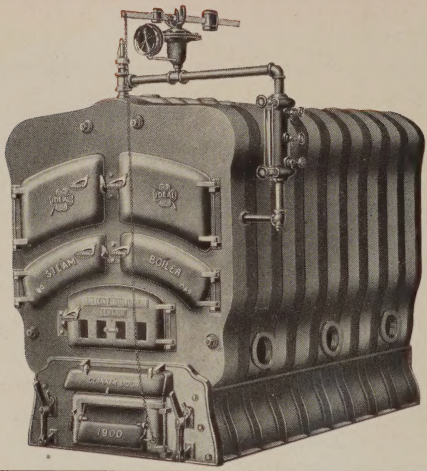
Faithfully yours,

AMERICAN RADIATOR COMPANY

January, 1904.

Discounts furnished only to the regular Trade on application.

Ideal Sectional 36-in. Steam Boilers



No.	Sec-tions	*Length Inches	Founda-tion Inches	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
065	5	46¾	43x46	36x32	2-5	1800	$640 00
066	6	55	51x46	36x40	2-5	2250	770 00
067	7	63¼	59x46	36x48	2-5	2700	882 00
068	8	71½	67x46	36x56	3-5	3150	974 00
069	9	79¾	75x46	36x64	3-5	3600	1064 00

Total height . . . . . 72 inches
Total width . . . . . 60½ "
Height of water line . . . . . 61 "

*Add 10¼ inches to length of Boilers, to allow for smoke hood on rear.

Size of Smoke Pipe for Nos. 065, 066, 067 and 068 Boilers, 14 inches; for No. 069 Boilers, 16 inches.

For additional details of measurements, see pages 38 and 39.

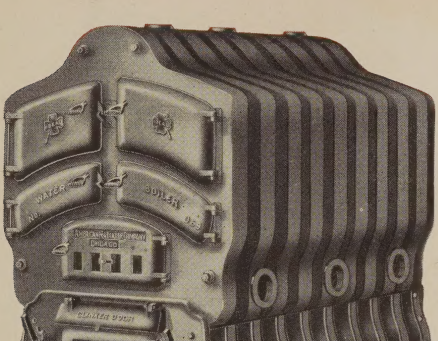
Boilers of greater capacity than listed above can be supplied by adding extra sections at same proportionate price.

For each supply outlet on top of Boiler there is a corresponding return inlet on either side of Boiler. Extra tappings can be provided if desired.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Sectional 36-in. Water Boilers



No.	Sections	*Length Inches	Foundation Inches	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
365	5	46¾	43x46	36x32	2-5	2975	$630 00
366	6	55	51x46	36x40	2-5	3700	750 00
367	7	63¼	59x46	36x48	2-5	4450	862 00
368	8	71½	67x46	36x56	3-5	5200	954 00
369	9	79¾	75x46	36x64	3-5	5950	1044 00

Total height . . . . . 72 inches
Total width . . . . . 57½ "

*Add 10¼ inches to length of Boilers, to allow for smoke hood on rear.

Size of Smoke Pipe for Nos. 365, 366, 367 and 368 Boilers, 14 inches; for No. 369 Boilers, 16 inches.

For additional details of measurements, see pages 38 and 39.

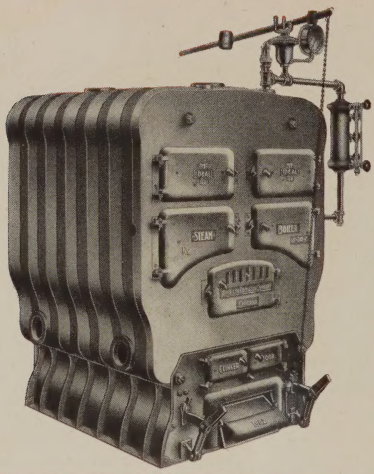
Boilers of greater capacity than listed above can be supplied by adding extra sections at same proportionate price.

For each supply outlet on top of Boiler there is a corresponding return inlet on either side of Boiler. Extra tappings can be provided if desired.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Sectional 30-in. Steam Boilers



No.	Sections.	*Length Inches	Foundation Inches	Grate Inches	Outlets Inch's	Ratings (Note)	Price Complete
S-30-5	5	35¼	32x40	30x28	2-4	1275	$482 50
S-30-6	6	42½	39x40	30x35	2-4	1625	587 50
S-30-7	7	49¾	46x40	30x42	2-4	1975	692 50
S-30-8	8	57	53x40	30x49	3-4	2325	790 50

Total height of Boilers	69¼	inches.
Total width of Boilers	51	"
Height of Water Line	60½	"
Size of Smoke Pipe	13	"

*Add $9\frac{5}{16}$ inches to length to allow for smoke hood on rear.

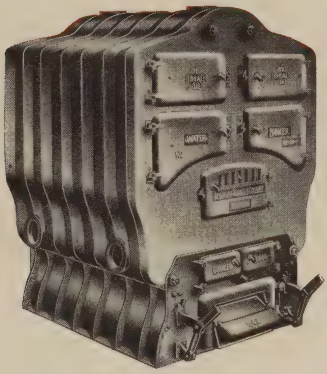
For additional details of measurements see pages 38 and 39.

For each supply outlet on top of Boiler, there is a corresponding return inlet on either side of Boiler. Extra tappings can be provided if desired.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Sectional 30-in. Water Boilers



No.	Sections	*Length Inches	Foundation Inches	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
W-30-5	5	35¼	32x40	30x28	2-4	2100	$472 50
W-30-6	6	42½	39x40	30x35	2-4	2675	577 50
W-30-7	7	49¾	46x40	30x42	2-4	3250	682 50
W-30-8	8	57	53x40	30x49	3-4	3825	780 50

Total height of Boilers . . . . . 65½ inches.
Total width of Boilers . . . . . 50 "
Size of Smoke Pipe . . . . . 13 "

*Add $9\frac{5}{16}$ inches to length to allow for smoke hood on rear.

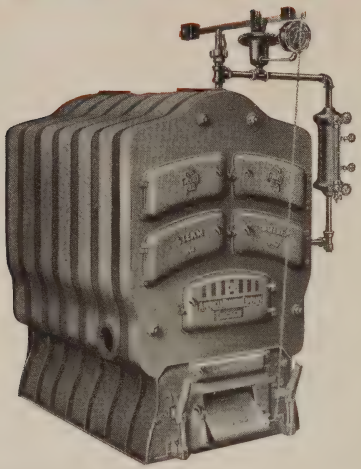
For additional details of measurements see pages 38 and 39.

For each supply outlet on top of Boiler, there is a corresponding return inlet on either side of Boiler. Extra tappings can be provided if desired.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Sectional 24-in. Steam Boilers



No.	Sections	*Length Inches	Foundation Inches	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
045	5	39	35x34	24x29	2-4	900	$370 00
046	6	46¼	42x34	24x36¼	2-4	1100	437 50
047	7	53½	49x34	24x43½	2-4	1300	505 00
048	8	60¾	56x34	24x50¾	3-4	1500	572 50

Total height of Boilers . . . . . 62½ inches
Total width of Boilers . . . . . 40½ "
Height of Water Line . . . . . 49½ "
Size of Smoke Pipe . . . . . 12 "

*Add 14¼ inches to length to allow for smoke hood on rear.

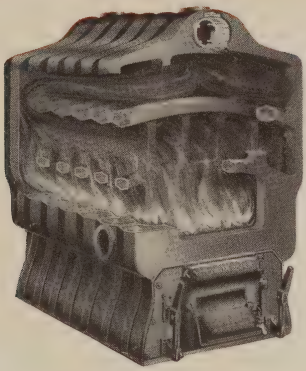
For additional details of measurements, see pages 38 and 39.

For each supply outlet on top of Boiler there is a corresponding return inlet on either side of Boiler. Extra tappings can be provided if desired.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Sectional 24-in. Water Boilers



No.	Sections	*Length Inches	Foundation Inches	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
245	5	39	35x34	24x29	2-4	1500	$360 00
246	6	46¼	42x34	24x36¼	2-4	1825	427 50
247	7	53½	49x34	24x43½	2-4	2150	495 00
248	8	60¾	56x34	24x50¾	3-4	2475	562 50

Total height of Boilers . . . . . 59¼ inches
Total width of Boilers . . . . . 40½ "
Size of Smoke Pipe . . . . . 12 "

*Add 14¼ inches to length to allow for smoke hood on rear.

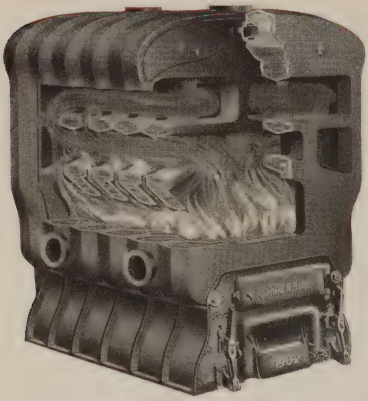
For additional details of measurements, see pages 38 and 39.

For each supply outlet on top of Boiler there is a corresponding return inlet on either side of Boiler. Extra tappings can be provided if desired.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Sectional 21-in. Steam Boilers



No.	Sections	*Length Inches	Foundation Inches	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
S-21-5	5	35	31x36	21x28	2-4	800	$340 00
S-21-6	6	42	31x43	21x35	2-4	1000	400 00
S-21-7	7	49	31x50	21x42	2-4	1200	460 00

Total height of Boilers . . . . . 58 3/8 inches.
Total width of Boilers . . . . . 40 "
Height of Water Line . . . . . 50 "
Size of Smoke Pipe . . . . . 10 "

*Add 7 11/16 inches to length to allow for smoke hood.

For additional details of measurements, see pages 38 and 39.

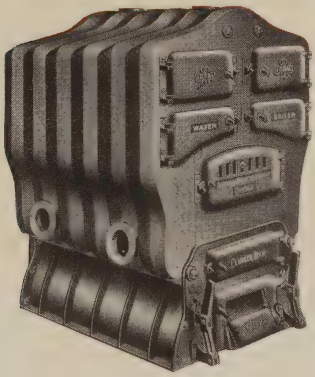
For each supply outlet on top of Boiler, there is a corresponding return inlet on either side of Boiler.

Extra tappings can be provided if desired.

When soft coal is to be used for fuel a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Sectional 21-in. Water Boilers



No.	Sections	*Length Inches	Foundation Inches	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
W-21-5	5	35	31x36	21x28	2-4	1325	$330 00
W-21-6	6	42	31x43	21x35	2-4	1650	390 00
W-21-7	7	49	31x50	21x42	2-4	2000	450 00

Total height of Boilers . . . . . 54⅞ inches.
Total width of Boilers . . . . . 39 "
Size of Smoke Pipe . . . . . 10 "

*Add 7 11/16 inches to length to allow for smoke hood.

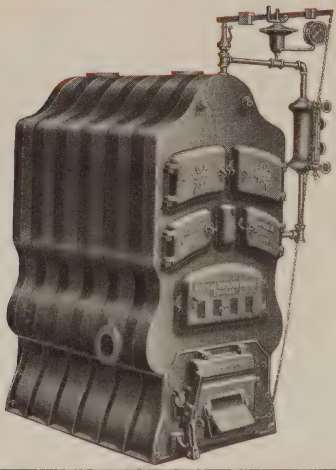
For additional details of measurements see pages 38 and 39.

For each supply outlet on top of Boiler, there is a corresponding return inlet on either side of Boiler. Extra tappings can be provided if desired.

When soft coal is to be used for fuel a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25

Ideal Sectional 18-in. Steam Boilers



No.	Sections	*Length Inches	Foundation Inches	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
084	4	28	24x27	18x18	2-3	375	$212 50
085	5	34	30x27	18x24	2-3	500	250 00
086	6	40	36x27	18x30	2-3	625	287 50
087	7	46	42x27	18x36	2-3	750	325 00

Total height of Boilers . . . . . 54¼ inches
Total width of Boilers . . . . . 28 "
Height of Water Line . . . . . 44 "
Size of Smoke Pipe . . . . . 8 "

*Add 11¾ inches to length to allow for smoke hood on rear.

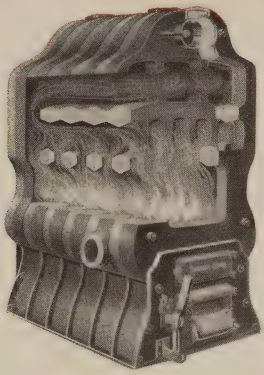
For additional details of measurements, see pages 38 and 39.

For each supply outlet on top of Boiler there is a corresponding return inlet on either side of Boiler. Extra tappings can be provided if desired.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Sectional 18-in. Water Boilers



No.	Sections	*Length Inches	Foundation Inches	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
184	4	28	24x27	18x18	2-3	625	$202 50
185	5	34	30x27	18x24	2-3	825	240 00
186	6	40	36x27	18x30	2-3	1025	277 50
187	7	46	42x27	18x36	2-3	1250	315 00

Total height of Boilers . . . . . 51¼ inches
Total width of Boilers . . . . . 28 "
Size of Smoke Pipe . . . . . 8 "

*Add 11¾ inches to length to allow for smoke hood on rear.

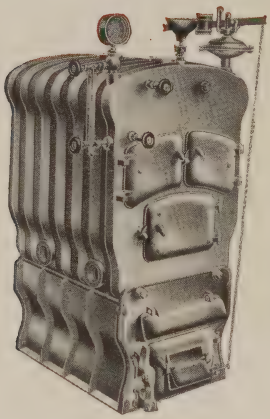
For additional details of measurements, see pages 38 and 39.

For each supply outlet on top of Boiler there is a corresponding return inlet on either side of Boiler. Extra tappings can be provided if desired.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Sectional 12-in. Steam Boilers



No.	Sections	*Length Inches	Capacity Firepot	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
502	5	23⅜	15x12x20	12x14	2-2½	225	$127 00
602	6	27⅝	15x16x20	12x18	2-2½	300	190 00
702	7	31⅞	15x20x20	12x22	2-2½	375	212 50

Total height of Boilers . . . . . 50¼ inches.
Total width of Boilers . . . . . 27½ "

*Add ⅝ in. to length to allow for smoke pipe collar on rear.

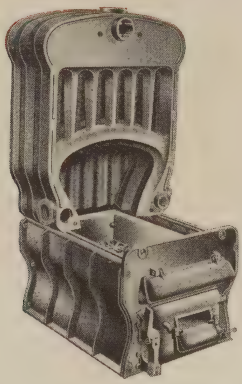
Size of smoke pipe for Boilers . . . 6 inches.
Height of Water Line . . . . . 43 "

For additional details of measurements, see pages 38 and 39.

Where it is desired to use soft coal for fuel it is recommended that the 18-inch Sectional or the Premier Soft Coal Boilers be selected.

See Note, page 25.

Ideal Sectional 12-in. Water Boilers



No.	Sections	*Length Inches	Capacity Firepot	Grate Inches	Outlets Inches	Ratings (Note)	Price Complete
512	5	23⅜	15x12x20	12x14	2-2½	375	$109 50
612	6	27⅝	15x16x20	12x18	2-2½	500	180 00
712	7	31⅞	15x20x20	12x22	2-2½	625	202 50

Total height of Boilers . . . . . 50¼ inches.
Total width of Boilers . . . . . 27½ "
Size of Smoke Pipe . . . . . 6 "

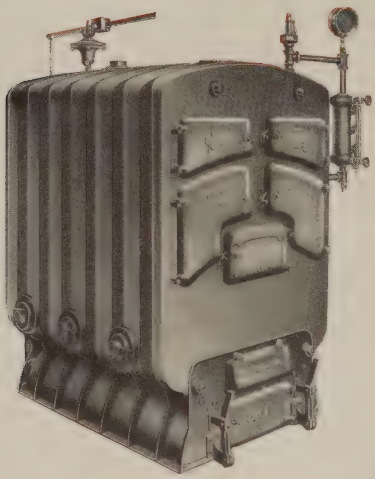
*Add ⅝ in. to length to allow for smoke pipe collar on rear.

For additional details of measurements, see pages 38 and 39.

Where it is desired to use soft coal for fuel it is recommended that the 18-inch Sectional or the Premier Soft Coal Boilers be selected.

See Note, page 25.

Ideal No. 5 Coke Steam Boilers



No.	Sections	*Length	Foundation Inches	Grate Inches	Average Firepot Inches	Outlet Inches	Ratings (See Note)	Price Complete
S-5-5	5	37¼	40x38	22x32½	32x32½	2-4	1400	$600 00
S-5-6	6	45½	40x46¼	22x40¾	32x40¾	2-4	1700	690 00
S-5-7	7	53¾	40x54½	22x49	32x49	3-4	2000	780 00
S-5-8	8	62	40x62¾	22x57¼	32x57¼	3-4	2300	870 00
S-5-9	9	70¼	40x71	22x65½	32x65½	4-4	2600	960 00

*Add 8⅝ inches for smoke hood in rear.

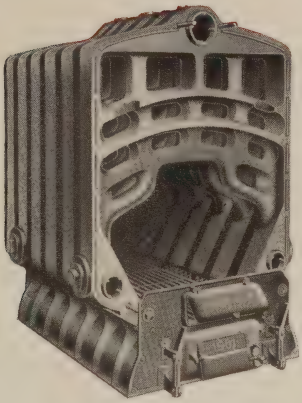
Total height . . . . . 72 inches.
Total width . . . . . 48 "
Height of Water Line . . . . . 64 "
Size of Smoke Pipe . . . . . 12 "

For additional details of measurements, see pages 40 and 41.

These Boilers also yield good results when used with hard coal, the magazine feature enabling the boilers to run a long time with one firing.

See Note, page 25.

Ideal No. 5 Coke Water Boilers



No.	Sections	*Length	Foundation Inches	Grate Inches	Average Firepot Inches	Outlet Inches	Ratings (See Note)	Price Complete
W-5-5	5	37¼	40x38	22x32½	32x32½	2-4	2325	$590 00
W-5-6	6	45½	40x46¼	22x40¾	32x40¾	2-4	2800	675 00
W-5-7	7	53¾	40x54½	22x49	32x49	3-4	3300	760 00
W-5-8	8	62	40x62¾	22x57¼	32x57¼	3-4	3800	845 00
W-5-9	9	70¼	40x71	22x65½	32x65½	4-4	4300	930 00

*Add 8⅝ inches for smoke hood in rear.

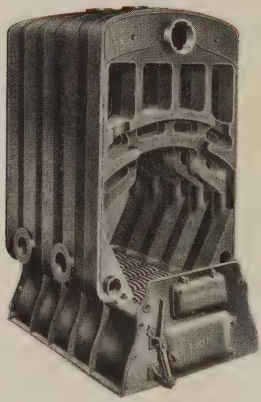
Total height . . . . . 69 inches
Total width . . . . . 48 "
Size of Smoke Pipe . . . . . 12 "

For additional details of measurements, see pages 40 and 41.

These Boilers also yield good results when used with hard coal, the magazine feature enabling the boilers to run a long time with one firing.

See Note, page 25.

Ideal No. 4 Coke Steam Boilers



No.	Sections	*Length	Foundation Inches	Grate Inches	Average Firepot Inches	Outlet Inches	Ratings (See Note)	Price Complete
S-4-5	5	33½	33⅝x34⅛	17x29	24⅛x29	2-4	800	$375 00
S-4-6	6	40¾	33⅝x41⅜	17x36¼	24⅛x36¼	2-4	1000	445 00
S-4-7	7	48	33⅝x48⅝	17x43½	24⅛x43½	2-4	1200	515 00

*Add 8½ inches for smoke hood in rear.

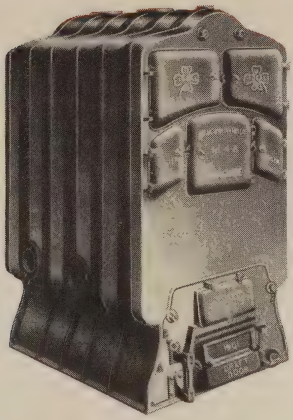
Total height	66	inches
Total width	36	"
Height of Water Line	57½	"
Size of Smoke Pipe	12	"

For additional details of measurements, see pages 40 and 41.

These Boilers also yield good results when used with hard coal, the magazine feature enabling the boilers to run a long time with one firing.

See Note, page 25.

Ideal No. 4 Coke Water Boilers



No.	Sections	*Length	Foundation Inches	Grate Inches	Average Firepot Inches	Outlet In.	Ratings (See Note)	Price Complete
W-4-5	5	33½	33⅝x34⅛	17x29	24⅛x29	2-4	1325	$365 00
W-4-6	6	40¾	33⅝x41⅜	17x36¼	24⅛x36¼	2-4	1650	435 00
W-4-7	7	48	33⅝x48⅝	17x43½	24⅛x43½	2-4	2000	505 00

*Add 8½ inches for smoke hood in rear.

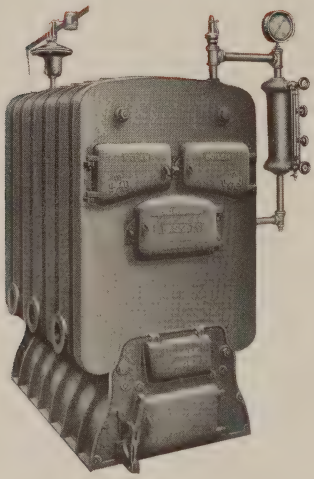
Total height . . . . . 62½ inches
Total width . . . . . 36 "
Size of Smoke Pipe . . . . . 12 "

For additional details of measurements, see pages 40 and 41.

These Boilers also yield good results when used with hard coal, the magazine feature enabling the boilers to run a long time with one firing.

See Note, page 25.

Ideal No. 3 Coke Steam Boilers



No.	Sections	*Length	Foundation Inches	Grate Inches	Average Fire-pot Inches	Outlet Inches	Ratings (See Note)	Price Complete
S-3-5	5	29⅜	28x29⅞	12x25	18x25	2-3	500	$260 00
S-3-6	6	35⅝	28x36⅛	12x31¼	18x31¼	2-3	600	295 00
S-3-7	7	41⅞	28x42⅜	12x37½	18x37½	2-3	700	330 00

*Add 7 inches for smoke hood in rear.

Total height	56	inches.
Total width	30½	"
Height of Water Line	47	"
Size of Smoke Pipe	9	"

For additional details of measurements, see pages 40 and 41.

These Boilers also yield good results when used with hard coal, the magazine feature enabling the boilers to run a long time with one firing.

See Note page 25.

Ideal No. 3 Coke Water Boilers

No.	Sec-t'ns	*Length	Founda-tion Inches	Grate Inches	Average Firepot Inches	Outlet Inches	Rat-ings (See Note)	Price Complete
W-3-5	5	29⅜	28x29⅞	12x25	18x25	2-3	825	$250 00
W-3-6	6	35⅝	28x36⅛	12x31¼	18x31¼	2-3	1000	285 00
W-3-7	7	41⅞	28x42⅜	12x37½	18x37½	2-3	1150	320 00

*Add 7 inches for smoke hood in rear.

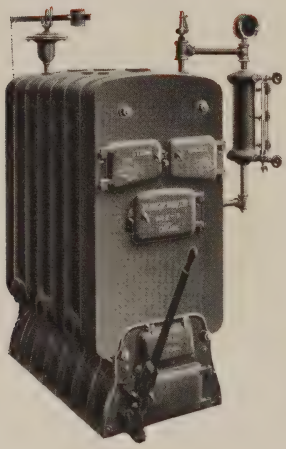
Total height . . . . . 53 inches.
Total width . . . . . 30½ "
Size of Smoke Pipe . . . . . 9 "

For additional details of measurements, see pages 40 and 41.

These Boilers also yield good results when used with hard coal, the magazine feature enabling the boilers to run a long time with one firing.

See Note, page 25.

Ideal No. 2 Coke Steam Boilers



No.	Sections	*Length	Foundation Inches	Grate Inches	Average Firepot Inches	Outlet Inches	Ratings (See Note)	Price Complete
S-2-4	4	19¾	22x20⅝	10x15¾	15x15¾	2-2	225	$140 00
S-2-5	5	25	22x25⅞	10x21	15x21	2-2	300	170 00
S-2-6	6	30¼	22x31⅛	10x26¼	15x26¼	2-2	375	200 00
S-2-7	7	35½	22x36⅜	10x31½	15x31½	2-2	450	230 00

*Add 7 inches for smoke hood in rear.

Total height . . . . . 53 7/16 inches.
Total width . . . . . 24 "
Height of Water Line . . . . . 45¼ "
Size of Smoke Pipe . . . . . 7 "

For additional details of measurements, see pages 40 and 41.

These Boilers also yield good results when used with hard coal, the magazine feature enabling the boilers to run a long time with one firing.

See Note, page 25.

Ideal No. 2 Coke Water Boilers

No.	Sections	*Length	Foundation Inches	Grate Inches	Average Firepot Inches	Outlet Inches	Ratings (See Note)	Price Complete
W-2-4	4	19¾	22x20⅝	10x15¾	15x15¾	2-2	375	$130 00
W-2-5	5	25	22x25⅞	10x21	15x21	2-2	500	160 00
W-2-6	6	30¼	22x31⅛	10x26¼	15x26¼	2-2	625	190 00
W-2-7	7	35½	22x36⅜	10x31½	15x31½	2-2	750	220 00

*Add 7 inches for smoke hood in rear.

Total height . . . . . 49 inches.
Total width . . . . . 24 "
Size of Smoke Pipe . . . . . 7 "

For additional details of measurements, see pages 40 and 41.

These Boilers also yield good results when used with hard coal, the magazine feature enabling the boilers to run a long time with one firing.

See Note, page 25.

Ideal Sectional Tank Heaters

No.	Sec. tions	*Length Inches	Founda-tion Inches	Size of Grate	Inside of Firepot	Tank Capacity Gallons	Price Complete
1-4	4	19	16x16	8x12	12x12x20	300	$65 00
1-5	5	23	20x16	8x16	12x16x20	375	79 00
1-6	6	27	24x16	8x20	12x20x20	450	92 50
1-7	7	31	28x16	8x24	12x24x20	525	105 50

Total height of Boilers . . . . . 40 inches.
Total width of Boilers . . . . . 17 "
Size of Smoke Pipe . . . . . 5 "

*Add 5 inches to length to allow for Smoke Pipe connection on rear. No Fire Tools supplied with these Heaters.

No. 1-4 and 1-5 Heaters are tapped for one 2-inch outlet; Nos. 1-6 and 1-7 Heaters, two 2-inch outlets.

See Note, page 25.

Note

Ratings. The ratings for IDEAL Boilers provide that all piping (mains and risers, flow and return), in addition to the direct radiation to be used, shall be figured as radiating surface in estimating the size of Boiler required.

The ratings and list prices herein given were adopted March 31, 1903, and supersede those published in any and all previous catalogues.

When a pipe coil or cast-iron section is introduced into the firepot for the purpose of heating water for domestic use, additional capacity should be figured in determining size of Boiler, viz., in the case of Steam Boilers, 1¼ square feet of direct radiation for each gallon of water to be thus heated, and in the case of Water Boilers, 2 square feet of direct radiation for each gallon of water to be thus heated, according to the capacity of the tank to which coil or section is connected.

When indirect radiation is to be used, not less than 75 per cent increase over direct radiation should be figured in determining the size of Boiler required

In rating Steam Boilers as above, it is understood that an average pressure of 2 lbs. will be maintained at the Boiler. In rating Water Boilers as above, it is understood that the mean temperature of the water at the Boiler will be 180 degrees Fahrenheit.

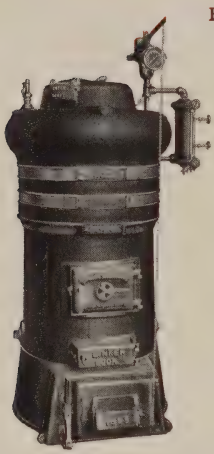
Guarantee. These Boilers are guaranteed only to the extent of furnishing new castings for any found defective in manufacture. They are conservatively rated according to accepted standards, but on account of the varying conditions surrounding their installation, we do not guarantee our Boilers except as above.

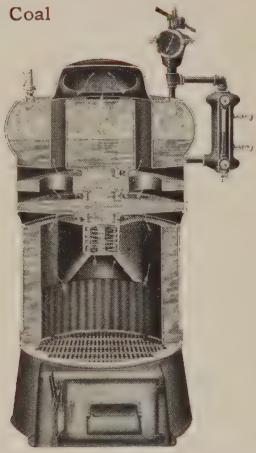
Recommendations. Both on account of increased efficiency and in the interest of greater economy, we strongly recommend that all Boilers be thoroughly protected by a substantial covering of asbestos.

On page 154 will be found a table giving the amount of Plastic Asbestos required to cover each size of the various styles of IDEAL Boilers. A price list of Molded Asbestos and Wool Felt Coverings for mains and risers will be found on page 155.

Ideal Premier Steam Boilers

Hard Coal





No.	Height (to Top Outlet) Inches	Diameter Inches	Diameter Grate Inches	Height Water Line Inches	Two Outlets Size Inches	Two Inlets Size Inch's	Ratings (Note)	Price Complete
A-015	52¾	22	15	49¼	2	2	225	$123 00
A-018	56½	25	18	52½	2½	2	300	149 50
A-019	61	25	18	57	2½	2	350	167 00
A-020	55¼	33	21	47½	2½	2½	400	193 00
A-021	60½	33	21	53	2½	2½	450	206 50
A-022	65½	33	21	58½	2½	2½	500	219 50
A-024	57¼	36⅜	24	49	3	3	550	232 50
A-025	62	36⅜	24	54	3	3	600	246 00
A-026	67¾	36⅜	24	59½	3	3	650	287 50
A-027	60	41¼	28	51	3½	3½	850	346 00
A-028	66½	41¼	28	57¼	3½	3½	925	367 50
A-029	71½	41¼	28	63¾	3½	3½	1000	389 50
A-031	63	46	32	53¼	4	4	1100	419 00
A-032	69	46	32	60	4	4	1200	448 00
A-033	75½	46	32	66¼	4	4	1300	477 00

Size of Smoke Pipe for Boilers No. 015, 6 inches; Nos. 018-019, 7 inches; 020 to 026, 9 inches; Nos. 027-033, 11 inches.

For additional detailed measurements, see pages 42 and 43.

See Note, page 25.

Ideal Premier Water Boilers

Hard Coal

No.	Height (to Top Outlet) Inches	Diameter Inches	Diameter Grate Inches	Size of Three Outlets Inches	Ratings (Note)	Price Complete
A-152	47½	22	15	2	375	$105 50
A-182	51	25¼	18	2	500	140 50
A-183	56	25¼	18	2	575	158 50
A-211	49¾	30⅝	21	2½	650	184 00
A-212	54¾	30⅝	21	2½	750	197 00
A-213	60¾	30⅝	21	2½	825	210 50
A-241	51¼	36⅜	24	3	900	224 00
A-242	56	36⅜	24	3	1000	237 00
A-243	61½	36⅜	24	3	1075	277 50
A-281	53¾	38⅝	28	3½	1400	336 00
A-282	60	38⅝	28	3½	1525	358 00
A-283	66	38⅝	28	3½	1650	380 00
A-321	56	46	32	4	1825	409 00
A-322	62¾	46	32	4	2000	438 50
A-323	69	46	32	4	2150	467 50

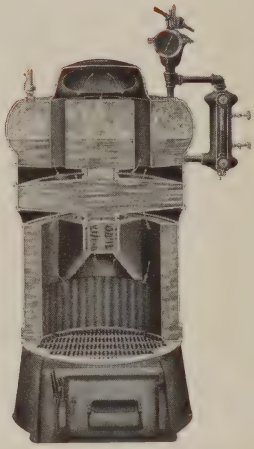
Size of Smoke Pipe for Boilers No. 152, 6 inches; Nos. 182-183, 7 inches; Nos. 211-243, 9 inches; Nos. 281-323, 11 inches.

For additional detailed measurements, see pages 42 and 43.

See Note, page 25.

Ideal Premier Steam Boilers

Soft Coal



No.	Height (to Top Outlet) Inches	Diameter Inches	Diameter Grate Inches	Height Water Line Inches	Two Outlets Size Inches	Two Inlets Size Inch's	Ratings (Note)	Price Complete
B-015	52¾	22	15	49¼	2	2	200	$123 00
B-018	56½	25	18	52½	2½	2	250	149 50
B-021	60½	33	21	53	2½	2½	400	193 00
B-022	65½	33	21	58½	2½	2½	450	206 50
B-025	62	36⅜	24	54	3	3	500	219 50
B-026	67¾	36⅜	24	59½	3	3	600	246 00
B-028	66½	41¼	28	57¼	3½	3½	800	331 00
B-029	71½	41¼	28	63¾	3½	3½	900	360 50
B-032	69	46	32	60	4	4	1050	404 50
B-033	75½	46	32	66¼	4	4	1200	448 00

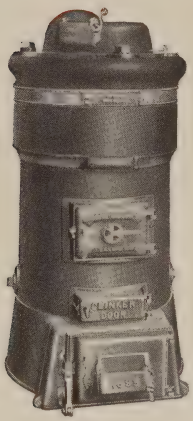
Size of Smoke Pipe for Boilers No. 015, 6 inches; No. 018, 7 inches; Nos. 021 to 026, 9 inches; Nos. 028-033, 11 inches.

For additional detailed measurements see pages 42 and 43.

See Note, page 25.

Ideal Premier Water Boilers

Soft Coal



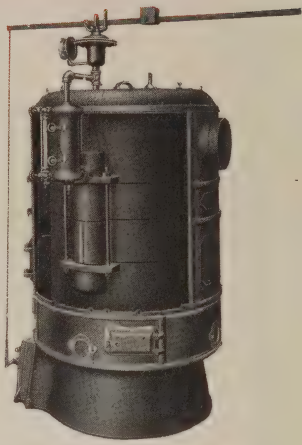
No.	Height (to Top Outlet) Inches	Diameter Inches	Diameter Grate Inches	Size of Three Outlets Inches	Ratings (Note)	Price Complete
B-152	47½	22	15	2	325	$105 50
B-182	51	25¼	18	2	400	140 50
B-212	54¾	30⅝	21	2½	650	184 00
B-213	60¾	30⅝	21	2½	750	197 00
B-242	56	34	24	3	825	210 50
B-243	61½	34	24	3	1000	237 00
B-282	60	38⅝	28	3½	1325	321 00
B-283	66	38⅝	28	3½	1500	350 50
B-322	62¾	43½	32	4	1725	394 50
B-323	69	43½	32	4	2000	438 50

Size of Smoke Pipe for Boilers No. 152, 6 inches; No. 182, 7 inches; Nos. 212-243, 9 inches; Nos. 282-323, 11 inches.

For additional detailed measurements, see pages 42 and 43.

See Note, page 25.

Ideal Portable Steam Boilers



No.	Sections	Height (to Top Outlets) Inches	Diameter Inches	Diameter Fire-pot Inch's	Height of Water Line Inches	Two Outlets and Two Inlets Inches	Ratings (Note)	Price Complete
103	2	48	31½	19	41	2½	300	$149 50
104	3	53½	31½	19	46½	2½	350	167 00
203	2	50	34	21	42	3	400	193 00
204	3	56¼	34	21	48¼	3	450	206 50
205	4	62½	34	21	54½	3	500	219 50
303	2	52½	38¾	25	43½	3½	550	232 50
304	3	59¼	38¾	25	50¼	3½	600	246 00
305	4	66	38¾	25	57	3½	650	287 50
403	2	54	44½	30	45	4	850	346 00
404	3	61¼	44½	30	52	4	1000	389 50
405	4	68½	44½	30	59	4	1100	419 00
504	3	63¾	52	36	53	5	1250	462 50
505	4	71½	52	36	61	5	1450	506 50
506	5	78¾	52	36	69	5	1600	565 00

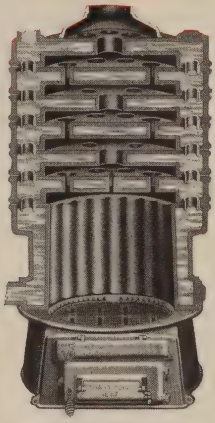
Size of Smoke Pipe for Nos. 103 and 104 Boilers, 8 inches; Nos. 203-205, 9 inches; Nos. 303-305, 10 inches; Nos. 403-405, 11 inches; Nos. 504-506, 12 inches.

For additional detailed measurements, see pages 44 and 45.

When soft coal is to be used for fuel, this Boiler should not be selected; but, rather, one of our "Sectional" or "Premier" Boilers.

See Note, page 25.

Ideal Portable Water Boilers



No.	Sections	Height (to Top Outlets) Inches	Diameter Inches	Diameter Firepot Inches	Two Outlets and two Inlets Inches	Ratings (Note)	Price Complete
13	3	43	28¾	19	2½	350	$101 00
14	4	47	28¾	19	2½	400	114 00
15	5	51	28¾	19	2½	450	131 50
24	4	49	32½	21	3	550	153 50
25	5	53½	32½	21	3	625	171 00
26	6	58	32½	21	3	675	187 50
34	4	50	36½	25	3½	775	204 00
35	5	55	36½	25	3½	875	217 50
36	6	60	36½	25	3½	975	233 50
37	7	65	36½	25	3½	1050	274 00
44	4	53	43	30	4	1200	299 50
45	5	58¼	43	30	4	1400	336 00
46	6	63½	43	30	4	1600	372 50
47	7	68¾	43	30	4	1700	389 50
55	5	60¼	50½	36	5	1775	402 00
56	6	65¾	50½	36	5	2000	438 50
57	7	71¼	50½	36	5	2250	486 00
58	8	76¾	50½	36	5	2400	511 50

Size of Smoke Pipe for Boilers Nos. 13-26, 8 inches; Nos. 34-37, 9 inches; Nos. 44-47, 10 inches; Nos. 55-58, 11 inches.

For additional detailed measurements, see pages 44 and 45.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal, but it is recommended that our Premier or Sectional Boilers be selected as more adaptable for use with soft coal.

See Note, page 25.

Ideal Invincible Steam Boilers

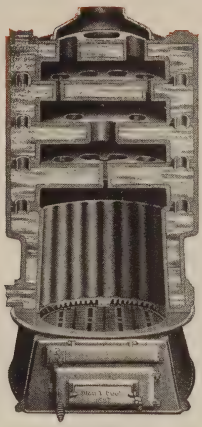
No.	Sections	Height (to Top Outlets) Inches	Diameter Inches	Diameter Firepot Inches	Height of Water Line Inches	Two Outlets and two Inlets Inches	Ratings (Note)	Price Complete
113	2	48	28¾	19	41	2½	225	$123 00
114	3	53½	28¾	19	46½	2½	250	131 50
223	2	50	32½	21	42	3	300	149 50
224	3	56¼	32½	21	48¼	3	350	167 00
225	4	62½	32½	21	54½	3	400	193 00
333	2	52½	36½	25	43½	3½	450	206 50
334	3	59¼	36½	25	50¼	3½	500	219 50
335	4	66	36½	25	57	3½	600	246 00
443	2	54	43	30	45	4	750	316 50
444	3	61¼	43	30	52	4	900	360 50
445	4	68½	43	30	59	4	1000	389 50
554	3	63¾	50½	36	53	5	1100	419 00
555	4	71½	50½	36	61	5	1300	477 00
556	5	78¾	50½	36	69	5	1450	521 00

Size of Smoke Pipe for Nos. 113 to 225, 8 inches; for Nos. 333, 334 and 335, 9 inches; for Nos. 443, 444 and 445, 10 inches; for Nos. 554, 555 and 556, 11 inches.

For additional detailed measurements see pages 44 and 46.

When soft coal is to be used for fuel, Boiler with size larger Firepot should be selected than would be required for hard coal. *See Note, page 25.*

Ideal Invincible Water Boilers



No.	Sections	Height (to Top Outlet) Inches	Diameter Inches	Diameter Grate Inches	Two Outlets and Two Inlets Inches	Ratings (Note)	Price Complete
120	2	43	29	19	2½	375	$105 50
130	3	48	29	19	2½	425	123 00
230	3	50	33	21	3	575	158 50
240	4	57	33	21	3	650	184 00
330	3	53	37	25	3½	825	210 50
340	4	60	37	25	3½	1000	237 00
430	3	54	43	30	4	1250	306 50
440	4	62	43	30	4	1500	350 50
450	5	69	43	30	4	1650	380 00
530	3	56	51	36	5	1825	409 00
540	4	64	51	36	5	2150	467 50
550	5	72	51	36	5	2400	511 50

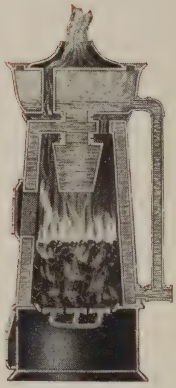
Size of Smoke Pipe for Boilers Nos. 120-240, 8 inches; Nos. 330-340, 9 inches; Nos. 430-450, 10 inches; Nos. 530-550, 11 inches.

For additional detailed measurements see pages 44 and 46.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Junior Steam Boilers



No.	Height (to Top Outlets) Inches	Diameter Inches	Diameter Firepot Inches	Height Water Line Inches	Ratings (Note)	Price Complete
*201	52	23	15	46	175	$105 50
*301	52	27	18	46	250	132 00
†302	56	27	18	50	300	149 00

*This Boiler has drop tube. †This Boiler has drop tube and extra section.

No fire tools are supplied with Junior Boilers.

Each Boiler is tapped with two 2-inch Outlets and two 2-inch Inlets.

Size of Smoke Pipe for No. 201 Boiler, 6 inches; for Nos. 301 and 302 Boilers, 7 inches.

When soft coal is to be used for fuel, a size larger Boiler should be selected than would be required for hard coal.

See Note, page 25.

Ideal Junior Tank Heaters

No.	Height (to Top Outlets) Inches	Diameter Inches	Diameter Firepot Inches	Outlets Inches	Ratings (See Note)	Tank Capacity Gallons	Price Complete
0	31	18	10	1-1½	60	80	$ 32 50
10	35	21	12	1-2	125	165	44 50
*11	35	21	12	1-2	155	200	49 00
†12	40	21	12	1-2	175	225	53 00
20	43	23	15	2-2	210	275	60 00
*21	43	23	15	2-2	255	325	70 50
†22	47	23	15	2-2	275	350	74 50
30	43	27	18	2-2	285	370	78 00
*31	43	27	18	2-2	375	485	98 50
†32	47	27	18	2-2	425	550	109 50

*This Heater has drop tube. †This Heater has drop tube and dome.

No fire tools supplied with these Heaters.

Size of Smoke Pipe for Heaters Nos. 0-12, 5 inches; Nos. 20-22, 6 inches; Nos. 30-32, 7 inches.

When soft coal is to be used for fuel, a size larger Heater should be selected than would be required for hard coal.

See Note, page 25.

Ideal Premier Junior Tank Heaters

No.	H'gt Inch's	Diameter* Inch's	Diameter Grate Inches	Outlets Inches	Smoke Collar Inches	Ratings (See Note)	Capacity Gallons	Price Complete
0	31	18	10	1-1½	5	60	80	$ 32 50
101	33⅛	14¾	10¼	1-2	5	75	100	35 50
121	41½	18½	12	1-2	6	130	175	46 00
122	41½	18⅝	12	1-2	6	165	225	53 00
151	47½	20¾	15	2-2	6	275	375	79 00
152	55¼	22	15	2-2	6	350	450	92 50
181	50⅛	24¼	18	2-2	7	425	550	109 50

*Diameter of base at floor line.

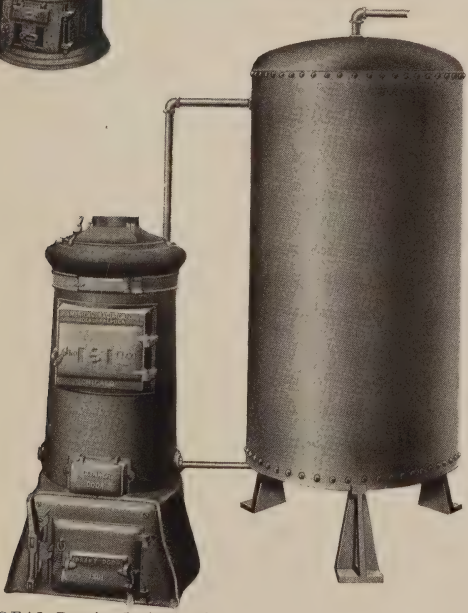
No fire tools supplied with these Heaters.

When soft coal is to be used for fuel, a size larger Heater should be selected than would be required for hard coal.

See Note, page 25.

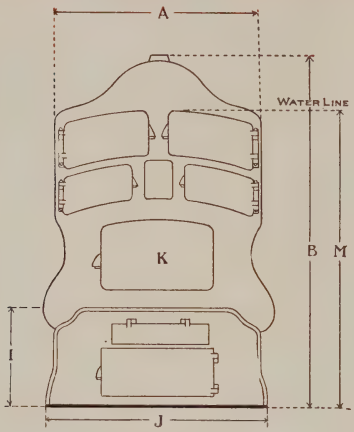
Tank Heaters and Storage Tanks

IDEAL Junior Water Boiler or Tank Heater connected to large Horizontal Tank for Storage of Hot Water.
See pages 35, 148 to 151.

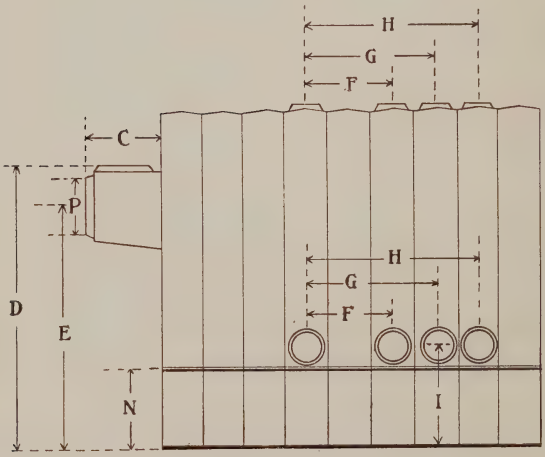


IDEAL Premier Junior Tank Heater connected to Vertical Tank for Storage of Hot Water.
See pages 36 and 148 to 151.

Sectional Boiler Measurements



Front View.



Sectional View.

For details of measurements see page opposite.

Sectional Boiler Measurements—Continued

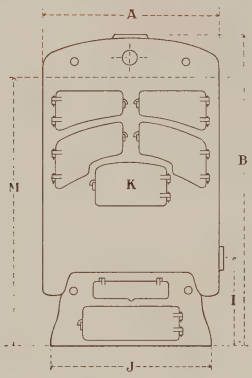
Table of distances between points as noted upon the outline drawings of IDEAL Sectional Boilers shown on opposite page. These measurements are all given in inches.

	12-inch Boilers		18-inch Boilers		21-inch Boilers		24-inch Boilers		30-inch Boilers		36-inch Boilers	
	Water	Steam	Water	Steam	Water	Steam	Water	Steam	Water	Steam	Water	Steam
A	27½	27½	28	28	39	40	40½	40½	50	51	57½	60½
B	50¼	50¼	51¼	54¼	54⅞	58⅜	59¼	62½	65½	69¼	72	72
†C	2½x⅝	2½x⅝	11¾	11¾	7 11/16	7 11/16	14¼	14¼	9 5/16	9 5/16	22⅜ 10¼	22⅜ 10¼
D	....	....	47½	47½	....	...	54⅛	54⅛	44⅞	44⅞	61½	61½
E	39	39	41¼	41¼	43¼	43¼	47¼	47¼	52⅛	52⅛	52½	52½
F	8½	8½	12	12	14	14	14½	14½	14½	14½	16½	16½
G	12¾	12¾	18	18	21	21	21¾	21¾	21¾	21¾	24¾	24¾
H	17	17	24	24	28	28	29	29	29	29	33	33
I	19 5/16	19 5/16	16	16	17½	17½	18¾	18¾	19⅛	19⅛	20⅜	20⅜
J	20½	20½	26⅝	26⅝	30¾	30¾	34	34	40	40	49½	49½
K	8x12	8x12	8½x17	8½x17	9x18	9x18	9x18	9x18	9x20	9x20	11x18½	11x18½
M	.	43	....	44	....	50	....	49½	....	60½	....	61
N	15⅞	15⅞	12⅜	12⅜	12⅜	12⅜	14	14	14	14	14	14
P	6	6	8	8	10	10	12	12	13	13	§14	§14

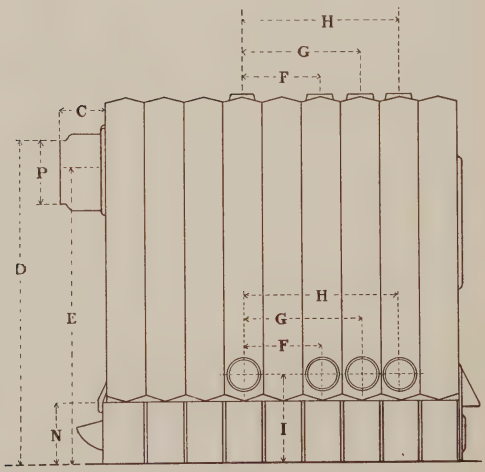
† Measured without Smoke Hood cover. Note "C" in the 36-inch Boiler has two measurements — the upper is for 18-inch Hood, the ower for 14½-inch Hood.

§ Except Nos. 369 and 069, in which the measurement is 16 inches.

Sectional Coke Boiler Measurements



Front View.



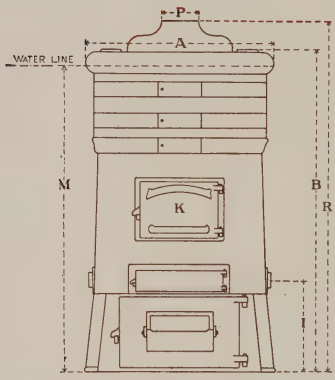
Sectional View.

For details of measurements see page opposite.

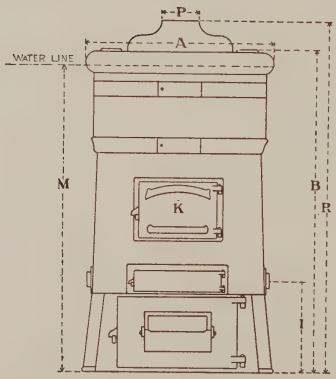
Table of distance between points as noted upon the outline drawings of IDEAL Coke Boilers shown on opposite page. These measurements are given in inches.

	No. 2		No. 3		No. 4		No. 5	
	Water	Steam	Water	Steam	Water	Steam	Water	Steam
A	24	24	30½	30½	36	36	48	48
B	48 1/16 5/16	53 7/16	53	56	62½	65 1/16 5/16	69	72
C	7	7	7	7	8½	8½	8⅝	8⅝
D	43	43	46½	46½	56¾	56¾	63¼	63¼
E	36	36	37½	37½	44¾	44¾	51¼	51¼
F	10½	10½	12½	12½	14½	14½	16½	16½
G	15¾	15¾	18¾	18¾	21¾	21¾	24¾	24¾
H	21	21	25	25	29	29	33	33
I	14 3/16	14 3/16	17½	17½	18¼	18¼	19 1/16 5/16	19 1/16 5/16
J	22	22	27½	27½	33⅝	33⅝	39¾	39¾
K	6½×10	6½×10	7¼×12	7¼×12	12×12	12×12	8¾×15½	8¾×15½
M	....	45¼	.....	47	....	57½	....	64
N	10 11/16	10 11/16	12¼	12¼	12¼	12¼	12¼	12¼
P	7	7	9	9	12	12	12	12

Premier Boiler Measurements



For Hard Coal



For Soft Coal

For details of measurements see page 43.

Premier Boiler Measurements Continued

Table of distances between points as outlined on skeleton sketch of Boilers shown on opposite page. These measurements are given in inches.

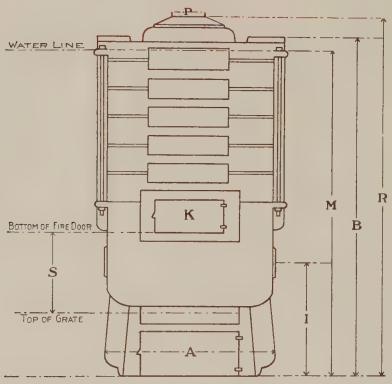
WATER

No.	A	B	I	K	P	R
152	22	48½	15½	6 x10	6	55¼
182	25¼	50¼	14⅝	6 x10	7	56⅞
183	25¼	55¾	14⅝	6 x10	7	61⅞
211	30⅝	49¾	15½	7½x10¾	9	57
212	30⅝	54¾	15½	7½x10¾	9	62
213	30⅝	60¾	15½	7½x10¾	9	67½
241	34	51¼	15¾	8 x11¾	9	58¼
242	34	56	15¾	8 x11¾	9	63¼
243	34	61½	15¾	8 x11¾	9	68½
281	38⅝	53¾	16	8½x12½	11	62¾
282	38⅝	60	16	8½x12½	11	68¾
283	38⅝	66	16	8½x12½	11	75
321	43½	56	17¼	8⅝x13⅝	11	64¾
322	43½	62¾	17¼	8⅝x13⅝	11	71¼
323	43½	69	17¼	8⅝x13⅝	11	77½

STEAM

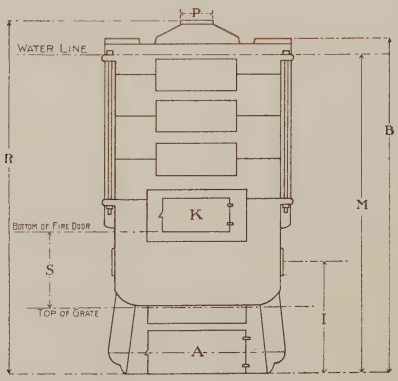
No.	A	B	I	K	M	P	R
015	22	53½	15½	6 x10	48½	6	60
018	25	56⅛	14⅝	6 x10	50⅛	7	62¾
019	25	59¾	14⅝	6 x10	55½	7	67½
020	33	55¼	15½	7½x10¾	47½	9	62½
021	33	60½	15½	7½x10¾	53	9	67¾
022	33	65½	15½	7½x10¾	58½	9	72
024	36⅜	57¼	15¾	8 x11¾	49	9	64½
025	36⅜	62	15¾	8 x11¾	54	9	69½
026	36⅜	67¾	15¾	8 x11¾	59½	9	75
027	41¼	60	16	8½x12½	51	11	69
028	41¼	66½	16	8½x12½	57¼	11	75¼
029	41¼	71½	16	8½x12½	63¾	11	81½
031	46	63	17¼	8⅝x13⅝	53¼	11	71¾
032	46	69	17¼	8⅝x13⅝	60	11	78½
033	46	75½	17¼	8⅝x13⅝	66¼	11	84

Portable Boiler Measurements



For details of measurements see page 45.

Invincible Boiler Measurements



For details of measurements see page 46.

Table of distances between points as outlined on skeleton sketch of Boilers shown on opposite page.

These measurements are given in inches.

WATER

No.	*A	B	I	P	R	S
13	28¾	44	17	8	48¼	11
14	28¾	48	17	8	52½	11
15	28¾	52¼	17	8	56¾	11
24	32½	50	17	8	54½	12
25	32½	54¾	17	8	59¼	12
26	32½	59	17	8	63½	12
34	36½	51¾	17½	9	57	11½
35	36½	56½	17½	9	61¾	11½
36	36½	61¼	17½	9	66¼	11½
37	36½	66	17½	9	71	11½
44	43	54¾	17¾	10	59¾	11½
45	43	60	17¾	10	65	11½
46	43	65¼	17¾	10	70¼	11½
47	43	70½	17¾	10	75½	11½
55	50½	62¾	19	11	68¼	11½
56	50½	68½	19	11	74	11½
57	50½	74¼	19	11	79¾	11½
58	50½	80	19	11	85½	11½

STEAM

No.	*A	B	I	M	P	R	S
103	31½	52½	16	42	8	43	11
104	31½	58½	16	47½	8	49	11
203	34	55¼	16	43	9	44½	12
204	34	61½	16	49¼	9	51	12
205	34	67½	16	55½	9	57	12
303	38¾	57	16¼	44	10	46¼	11½
304	38¾	64	16¼	51	10	53	11½
305	38¾	71	16¼	58	10	60	11½
403	44½	59	16¾	45¼	11	47½	11½
404	44½	67	16¾	52½	11	55½	11½
405	44½	73½	16¾	59½	11	63¼	11½
504	52	65¼	17¾	54¾	12	65¼	11½
505	52	73	17¾	62¼	12	73	11½
506	52	80¾	17¾	70	12	80¾	11½

*This dimension represents floor space occupied and includes the ashpit door projection with base diameter.

Table of distances between points as outlined on skeleton sketch of Boilers shown on page 44.

These measurements are given in inches.

WATER

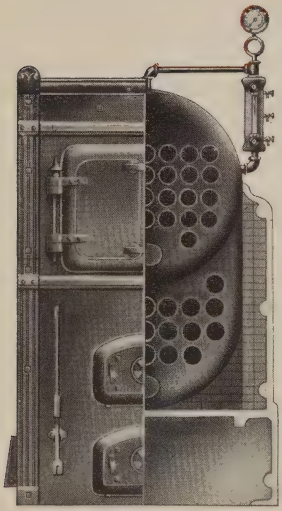
No.	*A	B	I	P	R	S
120	29	42	16¼	8	46½	11
130	29	47¾	16¼	8	52	11
230	32½	50¼	16½	8	54¾	12
240	32½	56½	16½	8	61	12
330	36½	52½	17	9	57½	11½
340	36½	59¼	17	9	64¼	11½
430	43	54¼	17½	10	59¼	11½
440	43	61¾	17½	10	66¾	11½
450	43	69	17½	10	74	11½
530	50½	56½	19	11	62¼	11½
540	50½	64¾	19	11	69¾	11½
550	50½	72	19	11	77½	11½

STEAM

No.	*A	B	I	M	P	R	S
113	29	48¼	16	42	8	53	11
114	29	54	16	48	8	58¾	11
223	32½	50½	16¼	43	8	55¼	12
224	32½	57	16¼	49¼	8	61½	12
225	32½	63¼	16¼	53¾	8	67⅞	12
333	36½	52½	16¼	44	9	57¾	11½
334	36½	59¼	16¼	51	9	64¼	11½
335	36½	66½	16¼	58	9	71¾	11½
443	43	54¼	16¾	44¾	10	59½	11½
444	43	61¾	16¾	52½	10	67	11½
445	43	69	16¾	59½	10	74¼	11½
554	50½	65¼	17¾	54¾	11	70½	11½
555	50½	73	17¾	62¼	11	78¼	11½
556	50½	80¾	17¾	70	11	86	11½

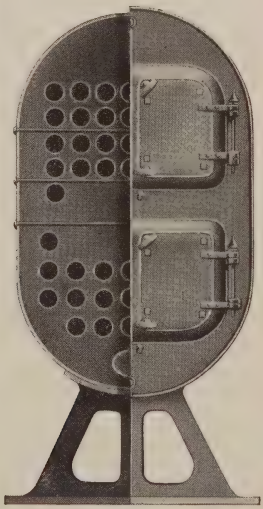
*This dimension represents floor space occupied and includes the ashpit door projection with base diameter.

Ideal Return Flue Portable Steel Boilers



Front

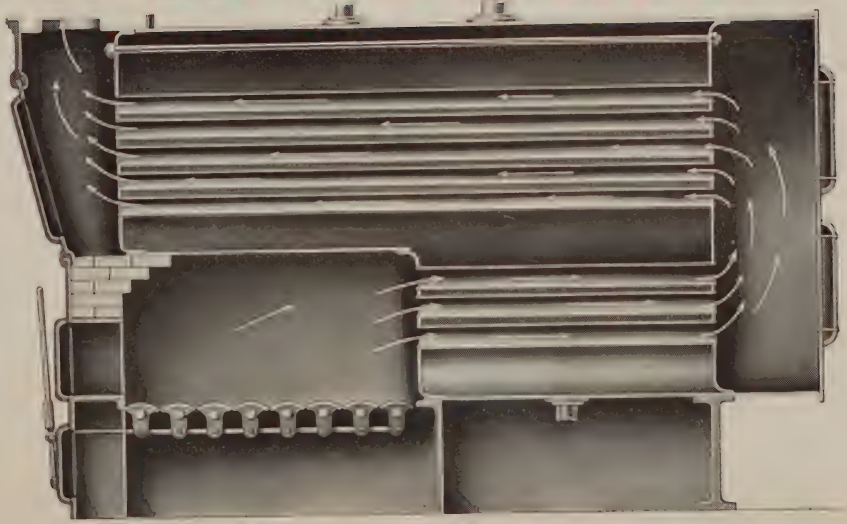
For illustration showing fire travel see page 48.



Rear

For dimensions, list prices, etc., see page 49

Ideal Return Flue Portable Steel Boiler



Showing fire travel.

Ideal Return Flue Portable Steel Boilers—Continued

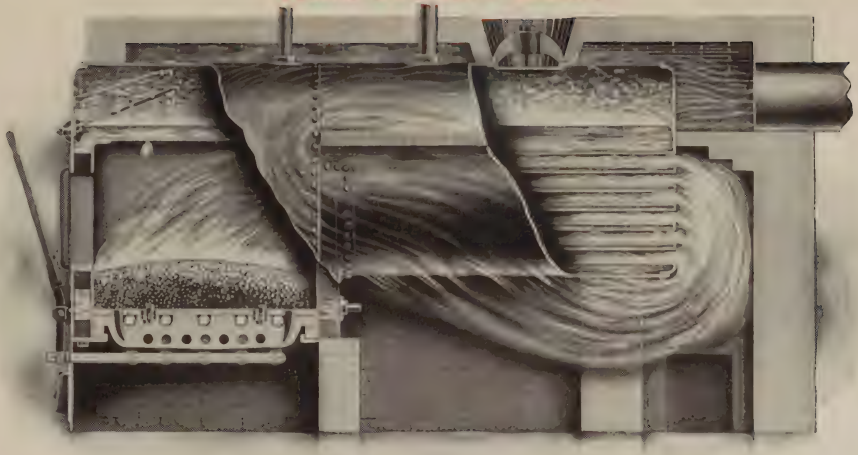
Size Boiler	1200	1500	1800	2100	2600	3000	3500	4500
Diameter Boiler, Inches	36	36	36	36	42	42	42	42
Height Boiler only, "	60	60	60	60	70	70	70	70
Length over all, "	92	104	110	128	118	130	142	166
Height of Fire Box "	24	24	24	24	27	27	27	27
Width of Grates "	36	36	36	36	42	42	42	42
Length of Grates "	30	36	36	48	42	48	54	60
Water Line "	67	67	67	67	77	77	77	77
Smoke Bonnet, "	10x16	10x16	10x16	10x16	10x22	10x22	10x22	10x22
Fire Doors, Double "	12x18	12x18	12x18	12x18	16x22	16x22	16x22	16x22
Size Steam Main Flange, Inches	4	4	5	5	5	6	6	6
Size Steam Return Flange "	3	3	3	3	4	4	4	4
Capacity in Sq. Ft., Direct Radiation, Steam	1200	1500	1800	2100	2600	3000	3500	4500
Capacity in Sq Ft., Direct Radiation, Water	2000	2475	2975	3475	4300	4950	5775	7425
*Number of Fire Brick	200	220	220	270	300	340	380	420
Number of Fire Brick (laid double)	350	385	385	475	525	600	660	735
Extreme Height, Inches	77	77	77	77	87	87	87	87
†List Price,	$450 00	$475 00	$500 00	$535 00	$615 00	$675 00	$730 00	$835 00
Shipping Weight	6000	6500	6800	7400	8300	9200	10000	11000

*The number of Fire Brick is estimated as the number of 4½-inch common Fire Brick required to line the Fire Box.
† List Price includes Steam Trimmings, but does not include Fire Brick.

MANHOLES AND DOUBLE FIRE DOORS IN ALL BOILERS OVER 30 INCHES DIAMETER

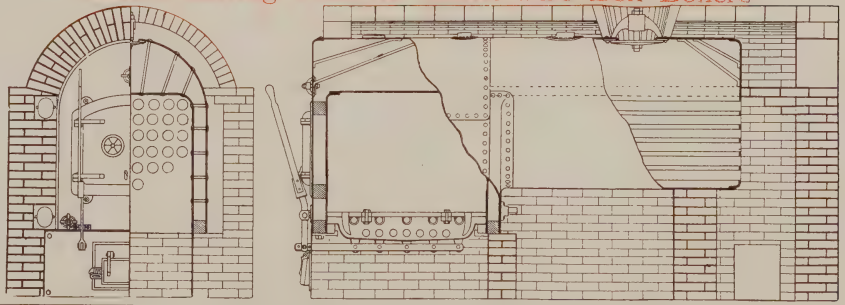
Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Diameter of Shell . . . inches	30	30	30	36	36	36	42	42	42	48	48	48	54	54
Length over all . . . . . feet	6½	7½	8½	7½	9	10½	8½	10	11½	10½	12	13½	14	16½
Number of Tubes	40	40	40	40	40	40	52	52	52	48	48	48	34	34
Diameter of Tubes. . . inches	2	2	2	2½	2½	2½	2½	2½	2½	3	3	3	4	4
Fire Doors { Single Doors, inches	12x18	12x18	12x18	....	....	....	....	....	....	....	....	....	....	....
Fire Doors { Double Doors, inches	....	....	....	16x22	16x22	16x22	16x24	16x24	16x24	18x30	18x30	18x30	18x30	18x30
Steam Tappings { Steam Outlet . in	3	3	4	4	4	4	4	6	6	6	6	6	7	7
Steam Tappings { Return Inlet . in	2½	2½	3	3	3	3	3	4	4	4	4	4	5	5
Water Tappings, Flow and Return (2 each) . . . . inches	4	4	4	5	5	5	5	5	6	6	6	6	7	7
Tapping for Safety Valve . inches	1	1	1	1¼	1¼	1¼	1½	1½	1½	2	2	2	2½	2½
Size of Smoke Pipe . . inches	14	14	14	16	16	16	18	18	18	22	22	22	24	24
Total Heating Surface, square feet	152	172	194	211	252	292	295	347	399	421	482	541	580	720
Length of Fire Box . . inches	26	32	38	32	38	44	38	44	50	44	50	56	56	62
Width of Fire Box . . inches	24	24	24	30	30	30	36	36	36	42	42	42	48	48
Grate Area . . . . square feet	4.3	5.3	6.3	6.7	8	9.2	9.5	11	12.5	13	14.7	16.4	18.6	20.6
Radiation will carry, Direct Steam	850	950	1100	1200	1500	1800	1800	2200	2600	2800	3300	3800	4500	5800
Radiation will carry, Direct Water	1350	1500	1750	1900	2400	2900	2900	3500	4200	4500	5300	6100	7200	9300
Price of Boiler only	195 00	205 00	212 00	243 00	272 00	303 00	320 00	353 00	397 00	442 00	479 00	514 00	617 00	662 00
Price Boiler and Regular Castings	220 00	233 00	243 00	277 00	310 00	344 00	364 00	401 00	449 00	498 00	540 00	579 00	689 00	739 00
Approximate Shipping Weight, Boiler and Castings	2125	2425	2950	3425	3875	4300	4525	5075	5550	6675	7350	8350	9125	10750
Price Trimmings, Extra . .	13 00	13 00	13 00	14 00	14 00	14 00	15 00	15 00	15 00	16 00	16 00	16 00	18 00	18 00

Acme Fire Box Boilers



Showing smoke travel.

Brick Setting Plan for Acme Fire Box Boilers



Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Extreme Height of Brick-work	65"	65"	65"	72"	72"	72"	79"	79"	79	85"	85"	85"	93"	93"
Height to Top of Boiler	57"	57"	57"	64"	64"	64"	71"	71"	71"	77"	77"	77"	85"	85"
" " Water Line	51"	51"	51"	56"	56"	56"	61"	61"	61"	66"	66"	66"	68"	68"
" of Ash Pit Front	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"	17"
Extreme Length of Brick-work	8'8"	9'8"	10'8"	9'9"	11'2"	12'8"	10'8"	12'2"	13'8"	13'4"	14'10"	16'4"	16'10"	19'4"
" Width " "	54"	54"	54"	60"	60"	60"	66"	66"	66"	80"	80"	80"	86"	86"

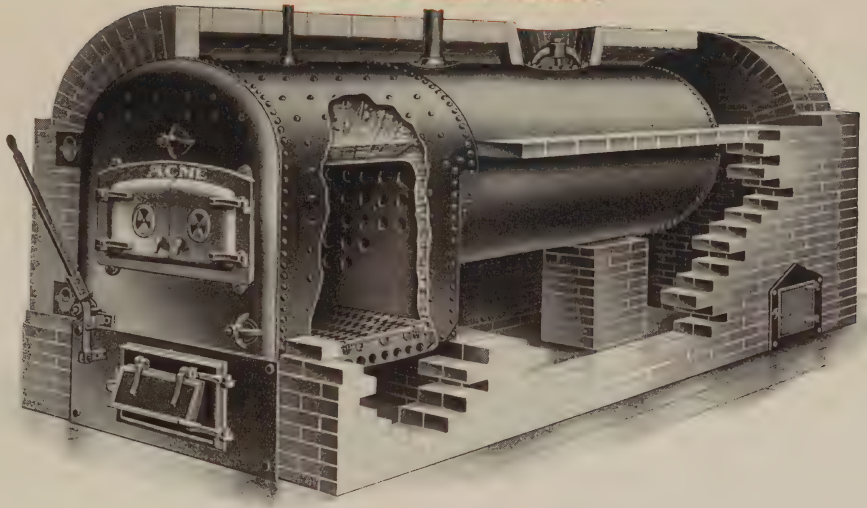
Trimmings—As listed, include: One Steam Gauge, one Water Column with three Gauge Cocks and Water Gauge, one Pop Safety Valve, one Automatic Draft Regulator with lever, two Weights and Pulleys and Jack Chain, one Drain Cock.

One Hoe and one Poker furnished with each Boiler.

Every Boiler fitted with a Safety Fusible Plug in Crown Sheet. Ash Pit Front provided with Special Lift Door for Automatic Regulator.

Regular Castings include Fire Door and Frame, Ash Pit Front with Doors, Large Soot Door and Frame, Four Small Soot Doors and Frames, and "Acme" Shaking Grates.

Acme Fire Box Boilers



Showing brick setting.

Price List American Direct Radiation

PER SQUARE FOOT OF HEATING SURFACE. SUBJECT TO CHANGE WITHOUT NOTICE

Height, inches	45	44	38	33	32	31	28	26	24	23	22	20	18	16	15	14	13
Price per square foot	41c	41c	42c	46c	46c	46c	48c	50c	50c	53c	53c	57c	58c	60c	62c	64c	66c
Single-Column:																	
Buffalo Standard, Single-Column, Ornamental, steam or water	....	3½	3	...	2½	....	..	2	...	....	1⅝	1½	1¼	....	....	....	....
National and Peerless, Single-Column steam and water	....	....	3		2½	....	....	2	....	1⅔	....	1½	....	....	....	....	....
St. Louis Standard, Single-Col., Ornamental, steam or water.	....	3½	3	....	2½	...	....	2	....	....	....	....	....	...	....	....	....
Two-Column:																	
Astro, water or steam	5	....	4	....	3⅓	....		2⅔	....	..	....	2	....	....	....	....	....
Buffalo Standard, Two-Column, Ornamental and Plain, steam and water	5	....	4	....	3⅓	....	....	2⅔	....	....	....	2	....	....	....	....	....
Ideal, steam	5	...	4	....	3⅓	....	....	2⅔	....	2⅓	....	2	....	....	....	....	....
National, Two-Column, steam and water	5	....	4	...	3⅓	....	....	2⅔	....	2⅓	....	2	....	....	....	....	....
Peerless, Two-Column, steam and water	5	....	4	....	3⅓	....	....	2⅔	....	2⅓	....	2	....	....	1½	....	....
Perfection, Ornamental and Plain, steam	5	....	4	....	3⅓	....	....	2⅔	....	2⅓	....	2	....	....	....	....	....
Perfection, Ornamental, water	5	....	4	....	3⅓	....	....	2⅔	....	....	....	2	....	....	....	....	....
St. Louis Standard, Two-Col., Ornamental, steam and water	5	....	4	....	3⅓	....	....	2⅔	....	....	....	2	....	....	....	....	....
Verona, steam and water	....	....	4	....	3⅓	....	....	2⅔	....	....	....	2	....	....	....	....	....
Three-Column:																	
Buffalo Standard, Three-Column, Ornamental and Plain, steam and water*	....	6	5	....	4½	....	....	3¾	....	....	3	2¾	2¼	....	....	....	....
Peerless, Three-Column, water or steam	....	....	5	....	....	....	....	3¾	....	....	....	....	....	....	....	....	....
Premier, Ornamental, steam and water	....	6	5	....	4½	....	.	3¾	....	....	3	....	2¼	....	....	....	....
Rococo, Ornamental and Plain, steam and water.	....	6	5	....	4½	....	....	3¾	....	..	3	....	2¼	....	....	....	....
St. Louis Standard, Three-Col., Ornamental, steam and water.	....	6	5	.	4½	....	....	3¾	....	....	3	2¾	2¼	....	....	....	....

Price List of American Direct Radiation Continued

PER SQUARE FOOT OF HEATING SURFACE. SUBJECT TO CHANGE WITHOUT NOTICE

Height, inches	45	44	38	33	32	31	28	26	24	23	22	20	18	16	15	14	13
Price per square foot	41c	41c	42c	46c	46c	46c	48c	50c	50c	53c	53c	57c	58c	60c	62c	64c	66c
Four-Column:																	
Buffalo Standard, Four-Col., Ornamental, steam or water	....	9	8	....	6⅔	....	..	5⅓	....	....	4	3½	3	....	..	....	....
National and Peerless, Four-Col., steam or water	....	....	8		6⅔		..	5⅓	....	4⅔	....	4	...			....	....
St. Louis Standard, Four-Col., Ornamental, steam or water	...	9	8		6⅔	....	....	5⅓	....	....	4	3½	3	....	....	....	
Flue and Window:																	
Ætna Flue, steam or water	...	....	....	....	....	....	..	....	....	....	....	6	5⅓	4⅔	....	4	3⅔
Areal Sanitary Box Base	....	....	....	....	....	....	....	....	....		....	....	....	....	..	..	....
Italian Flue, Ornamental and Plain, steam and water	....	....	7	....	5¼	....	....	4½	....	....	....	3¼	....	....	...	....	....
St. Louis Window, steam or water		...	....	....	....	..	....	....	..	....	....	....	....	....	3	..	....
Zenith Flue, steam and water	....		7	6	....	....	5	....		4	....	....	....	....	....	....	...
Zenith Window, steam or water	....	....	....	..	....	....	....	....		....	....	6	5⅓	4⅔	....	4	....

Figures in the above columns opposite the names of patterns of Radiators indicate the heights in which the various patterns are made, and the figures themselves represent the amount of heating surface contained in each height section.

*Buffalo Standard Three-Column Radiators in 20 and 18-inch heights are made in Water pattern only.

Price List of American Indirect Radiation

	Per Section
Primus, water, 8 square feet	$2 16
Excelsior, steam and water, 12 square feet	3 24
Excelsior Jr., steam, 8 square feet	2 16
Perfection Pin, Standard Size, steam or water, 10 square feet	2 70
Standard Pin, steam or water, 12 square feet	3 24
Standard Pin, steam or water, 15 square feet	$4 05
Perfection Pin, Extra Large, steam or water, 15 square feet	4 05
Cardinal, steam or water, 15 square feet	4 05
Sterling, steam or water, 20 square feet	5 40
Sanitary School Pin, steam or water, 20 square feet	5 40

Colonial Wall Radiators

Extra-large size, 29 inches long, 13¼ inches wide, 2⅝ inches thick, contains 9 square feet of heating surface.
Standard size 23 inches long, 13¼ inches wide, 2⅝ inches thick, contains 7 square feet of heating surface.
Small size, 16¾ inches long, 13¼ inches wide, 2⅝ inches thick, contains 5 square feet of heating surface.

National Single-Column Radiators

For Steam and Water

No. of Sections	*Length 2½-in. per Sec.	Heating Surface—Square Feet				
		38-in. Height. 3 sq. ft. per Sec.	32-in. Height. 2½ sq. ft. per Sec.	26-in. Height. 2 sq. ft. per Sec.	23-in. Height. 1⅔ sq. ft. per Sec.	20-in. Height. 1½ sq. ft. per Sec.
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15

These Radiators for Steam are tapped *solid*, as per list on page 114. These Radiators for Water are tapped 2 inches and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

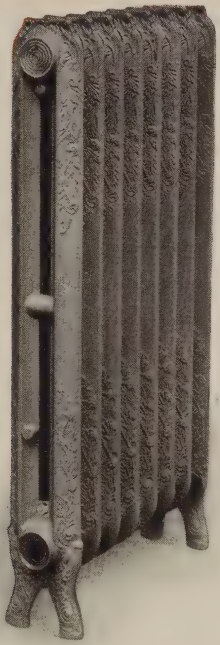
Each section is 4½ inches wide. Width of legs 5½ inches.

Distance from floor to center of tapping is 4½ inches, for both Steam and Hot Water (except in 32, 26, 23 and 20 inch heights where tapping is ¾-inch, distance is 4⅛ inches).

* In estimating *length* of this Radiator for Hot Water, *allow ½-inch* for each bushing.

Buffalo Standard Single-Column Ornamental Radiators

For Steam or Water



No. of Sections	L'gth, 2½ in. per Sec.	Heating Surface — Square Feet						
		44-in. Height. 3½ sq. ft. per Sec.	38-in. Height. 3 sq. ft. per Sec.	32-in. Height. 2½ sq. ft. per Sec.	26-in. Height. 2 sq. ft. per Sec.	22-in. Height. 1⅝ sq. ft. per Sec.	20-in. Height. 1½ sq. ft. per Sec.	18-in. Height. 1¼ sq. ft. per Sec.
2	5	7	6	5	4	3¼	3	2½
3	7½	10½	9	7½	6	4⅞	4½	3¾
4	10	14	12	10	8	6½	6	5
5	12½	17½	15	12½	10	8⅛	7½	6¼
6	15	21	18	15	12	9¾	9	7½
7	17½	24½	21	17½	14	11⅜	10½	8¾
8	20	28	24	20	16	13	12	10
9	22½	31½	27	22½	18	14⅝	13½	11¼
10	25	35	30	25	20	16¼	15	12½

Above Radiators are tapped solid, as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 5⅛ inches wide. Width of legs 5½ inches.

Distance from floor to center of tapping in single pipe Steam is 5 inches; two pipe Steam, supply 5½ inches, return 5 inches; for Water, either supply or return, 5½ inches.

St. Louis Standard Single-Column Ornamental Radiators

For Steam or Water

No. Sections	Length, 2½ in. per Section	Heating Surface—Square Feet			
		44-in. Height. 3½ sq. ft. per Section.	38-in. Height. 3 sq. ft. per Section.	32-in. Height. 2½ sq. ft. per Section.	26-in. Height. 2 sq. ft. per Section.
2	5	7	6	5	4
3	7½	10½	9	7½	6
4	10	14	12	10	8
5	12½	17½	15	12½	10
6	15	21	18	15	12
7	17½	24½	21	17½	14
8	20	28	24	20	16
9	22½	31½	27	22½	18
10	25	35	30	25	20

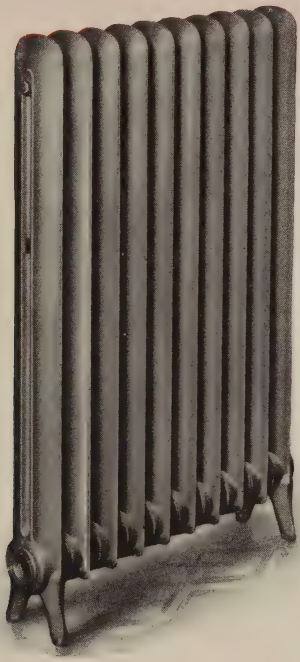
Above Radiators are tapped solid, as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 5½ inches wide. Width of legs, 6⅛ inches.

Distance from floor to center of tapping in single pipe, Steam, is 5 inches (except 2-inch tapping, in which case distance is 5½ inches); double pipe, Steam, 5½ inches supply, 5 inches return; Water, either supply or return, 5½ inches.

Peerless Single-Column Radiators

For Steam and Water



No. of Sections	*Length 2½-in. per Sec.	Heating Surface—Square Feet				
		38-in. Height. 3 sq. ft. per Sec.	32-in. Height. 2½ sq. ft. per Sec.	26-in. Height. 2 sq. ft. per Sec.	23-in. Height. 1⅔ sq. ft. per Sec.	20-in. Height. 1½ sq. ft. per Sec.
2	5	6	5	4	3⅓	3
3	7½	9	7½	6	5	4½
4	10	12	10	8	6⅔	6
5	12½	15	12½	10	8⅓	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11⅔	10½
8	20	24	20	16	13⅓	12
9	22½	27	22½	18	15	13½
10	25	30	25	20	16⅔	15

These Radiators for Steam are tapped *solid*, as per list on page 114. These Radiators for Water are tapped 2 inches and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 4½ inches wide. Width of legs 5½ inches.

Distance from floor to center of tapping is 4½ inches, for both Steam and Hot Water (except in 32, 26, 23 and 20 inch heights where tapping is ¾-inch, distance is 4⅛ inches).

***In estimating *length* of this Radiator for Hot Water, *allow ½-inch* for each bushing.**

The Verona Radiator

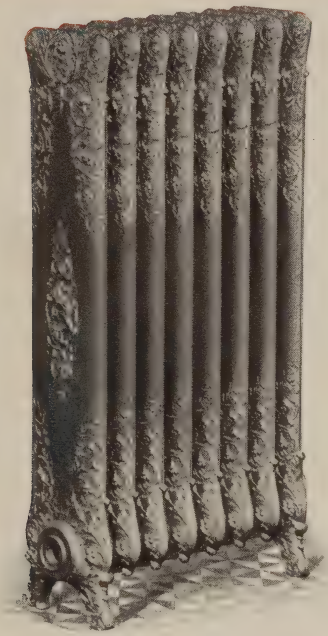
THERE is a boundary to every field of manufacture beyond which further gain in quality and beauty can be secured only at a cost out of all proportion to the practical results obtained. This is true of the "Verona" Radiator, for in its manufacture the line is not drawn at quality limit, but the seeking ever is for infinite perfection in every detail of the processes involved. It is difficult, by picture or description, to convey an adequate idea of the beauty of design, exquisite modeling and perfect workmanship embodied in the "Verona" Radiators. The full beauty of the casting can be appreciated only by viewing the article itself.

It represents the ripest ideas and the best efforts in radiator construction, incorporating most perfectly every improvement in design and manufacture. For beauty, richness and delicacy of ornamentation, elegance of proportion, finished smoothness of castings, appealing sense of lightness and gracefulness, the "Verona" is simply incomparable — it is a work of art in iron.

Two or three of these Radiators on the job, placed in vestibule, reception-room, parlors, den, library or the like, will give to the heating job *the* touch of elegance which will bring satisfaction and pleasure to the owner, causing him to become the Fitter's enthusiastic advertiser. There is no better advertisement than a well-pleased customer.

Verona Steam and Water Radiators

Patented Nov. 3, 1896.



No. of Sections	*Length, 2½ inches per Sec.	Heating Surface—Square Feet			
		38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3⅓ sq. ft. per Sec.	26-in. Height. 2⅔ sq. ft. per Sec.	20-in. Height 2 sq. ft. per Sec.
2	5	8	6⅔	5⅓	4
3	7½	12	10	8	6
4	10	16	13⅓	10⅔	8
5	12½	20	16⅔	13⅓	10
6	15	24	20	16	12
7	17½	28	23⅓	18⅔	14
8	20	32	26⅔	21⅓	16
9	22½	36	30	24	18
10	25	40	33⅓	26⅔	20

The Verona Radiator is tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 8 inches wide. Width of legs, 8½ inches.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, 4½ inches supply, 4 inches return; Hot Water, supply and return, 4½ inches.

* In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Perfection Ornamental Steam and Water Radiators

No. of Sections	*Length 2½ in. per Sec.	Heating Surface—Square Feet					
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3⅓ sq. ft. per Sec.	26-in. Height. 2⅔ sq. ft. per Sec.	23-in. Height. 2⅓ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20

Perfection Water Radiator is not made in 23-in. height.

Above Steam Radiators are tapped 2 inches; Water Radiators are tapped 1½ inches and all are bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

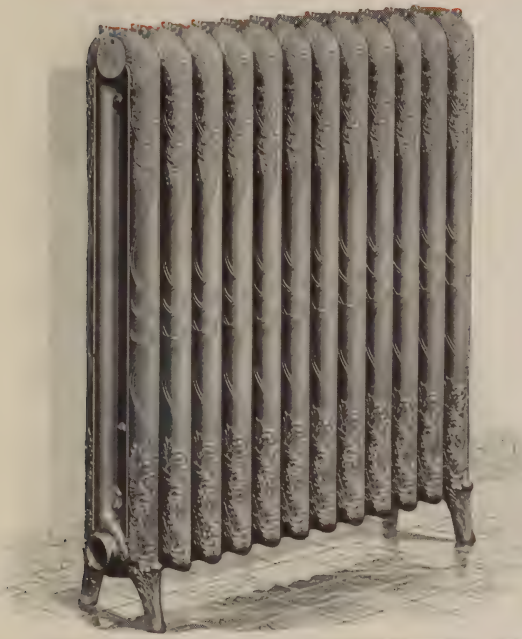
Each Section is 7¼ inches wide. Width of legs 9¼ inches.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, 4½ inches supply, 4 inches return; Hot Water, 4½ inches supply and return.

* In estimating *length* of Radiator, *allow ½ inch* for each bushing.

National Two-Column Radiators

For Steam and Water



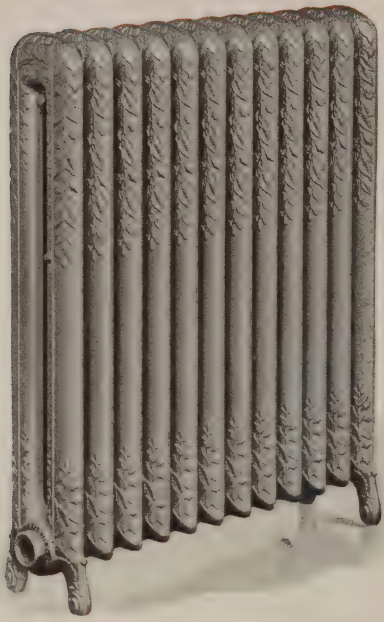
No. of Sections	*Length 2½-in. per Sec.	Heating Surface—Square Feet.					
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3⅓ sq. ft. per Sec.	26-in. Height. 2⅔ sq. ft. per Sec.	23-in. Height. 2⅓ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20

Above Radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118. Each Section is 7⅜ inches wide. Width of legs, 8½ inches.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, 4½ inches supply, 4 inches return; Hot Water, supply and return, 4½ inches.

* In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Ideal Steam Radiators



No. of Sections	*Length 2½-in. per Sec.	Heating Surface—Square Feet.					
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3⅓ sq. ft. per Sec.	26-in. Height. 2⅔ sq. ft. per Sec.	23 in. Height. 2⅓ sq. ft per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20

Ideal Steam Radiators in 38-inch Height are tapped 2 inches and bushed as per list on page 114; other heights are tapped *solid* as per same list. For list of *special tappings*, see pages 115 to 118.

Each Section is 7⅜ inches wide. Width of legs, 8½ inches.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, supply 4½ inches, return 4 inches. In other than 38-inch Height, distance from floor to center of either supply or return tapping is 4½ inches, except where ¾-inch tapping is required, in which case distance is 4⅛ inches.

*In estimating *length* of Radiator *allow ½ inch* for bushing.

Buffalo Standard Two-Column Orna'l Steam and Water Radiators

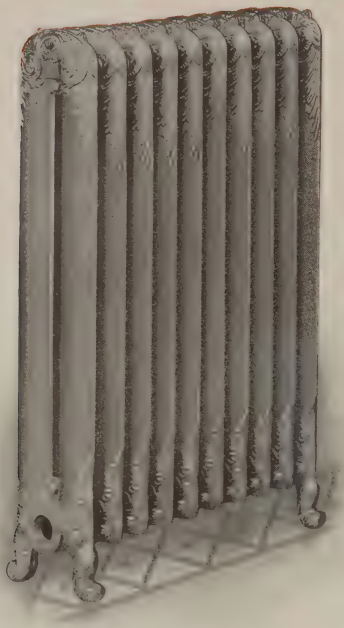
No. of Sections	Length 2½ in. per Sec.	Heating Surface—Square Feet				
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3⅓ sq. ft. per Sec.	26-in. Height. 2⅔ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4
3	7½	15	12	10	8	6
4	10	20	16	13⅓	10⅔	8
5	12½	25	20	16⅔	13⅓	10
6	15	30	24	20	16	12
7	17½	35	28	23⅓	18⅔	14
8	20	40	32	26⅔	21⅓	16
9	22½	45	36	30	24	18
10	25	50	40	33⅓	26⅔	20

Above Radiators are tapped solid as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 7¼ inches wide. Width of legs, 8½ inches.

Distance from floor to center of tapping in single-pipe Steam is 4 inches; for two-pipe Steam, supply, 4½ inches, return, 4 inches; for Water, either supply or return, 4½ inches.

St. Louis Standard Two-Column Orna'l Steam and Water Radiators



No. of Sections	Length 2½ in. per Sec.	Heating Surface—Square Feet				
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3⅓ sq. ft. per Sec.	26-in. Height. 2⅔ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4
3	7½	15	12	10	8	6
4	10	20	16	13⅓	10⅔	8
5	12½	25	20	16⅔	13⅓	10
6	15	30	24	20	16	12
7	17½	35	28	23⅓	18⅔	14
8	20	40	32	26⅔	21⅓	16
9	22½	45	36	30	24	18
10	25	50	40	33⅓	26⅔	20

Above Radiators are tapped solid as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 7¼ inches wide. Width of legs, 8½ inches.

Distance from floor to center of tapping in single-pipe Steam is 5 inches (except 2-inch tapping, in which case tapping is 5½ inches); two-pipe Steam, 4½ inches supply, 4 inches return; for Water, 4½ inches, supply or return.

Perfection Plain Steam Radiators

No. of Sections	*Length 2½-in. per Sec.	Heating Surface—Square Feet. 45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3⅓ sq. ft. per Sec.	26-in. Height. 2⅔ sq. ft. per Sec.	23-in. Height. 2⅓ sq. ft per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20

Above Radiators are tapped 2 inches, and bushed according to list on page 114.

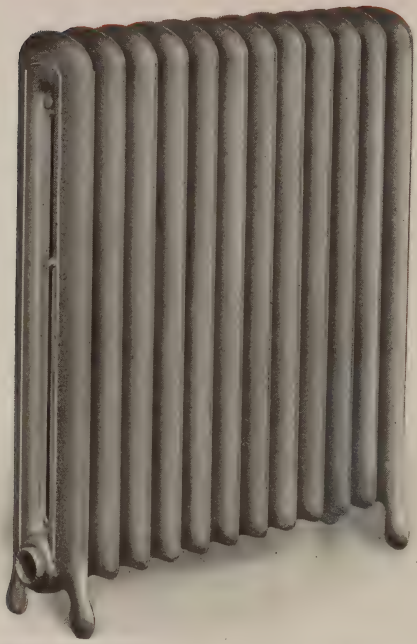
Each section is 7¼ inches wide. Width of legs, 9¾ inches.

Distance from floor to center of tapping: single-pipe Steam, 4 inches; double-pipe Steam, supply 4½ inches, return 4 inches.

* In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Peerless Two-Column Radiators

For Steam and Water



No. of Sections	*Length 2½-in. per Sec.	Heating Surface—Square Feet.					
		45-in. Height. 5 sq. ft. per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. 3⅓ sq. ft. per Sec.	26-in. Height. 2⅔ sq. ft. per Sec.	23 in. Height. 2⅓ sq. ft per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	6⅔	5⅓	4⅔	4
3	7½	15	12	10	8	7	6
4	10	20	16	13⅓	10⅔	9⅓	8
5	12½	25	20	16⅔	13⅓	11⅔	10
6	15	30	24	20	16	14	12
7	17½	35	28	23⅓	18⅔	16⅓	14
8	20	40	32	26⅔	21⅓	18⅔	16
9	22½	45	36	30	24	21	18
10	25	50	40	33⅓	26⅔	23⅓	20

Above radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118. Each Section is 7⅜ inches wide. Width of legs, 8½ inches.

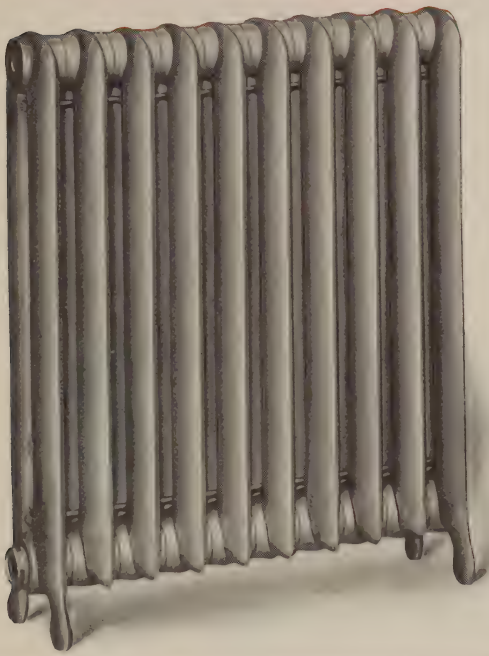
Distance from floor to center of tapping: one-pipe Steam, 4 inches; two-pipe Steam, 4½ inches supply, 4 inches return; Water, supply and return, 4½ inches.

* In estimating *length* of Radiator, *allow ½ inch* for each bushing.

NOTE.—Also now made in 15-in. Height, containing 1½ ft. per section.

Astro Two-Column Radiators

For Water or Steam



Number Sections	*Length 3 inches per Sec.	45-in. Height. 5 sq. feet per Sec.	38-in. Height. 4 sq. ft per Sec.	32-in. Height. 3⅓ sq. ft. per Sec.	26-in. Height. 2⅔ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	6	10	8	6⅔	5⅓	4
3	9	15	12	10	8	6
4	12	20	16	13⅓	10⅔	8
5	15	25	20	16⅔	13⅓	10
6	18	30	24	20	16	12
7	21	35	28	23⅓	18⅔	14
8	24	40	32	26⅔	21⅓	16
9	27	45	36	30	24	18
10	30	50	40	33⅓	26⅔	20

Above Radiators are tapped 2 inches and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each Section is 7⅜ inches wide. Width of legs, 8½ inches.

Distance from floor to center of bottom opening is 4½ inches.

* In estimating length of Radiator, *allow ½ inch* for bushing.

Buffalo Standard Two-Column Plain Radiators

For Steam and Water

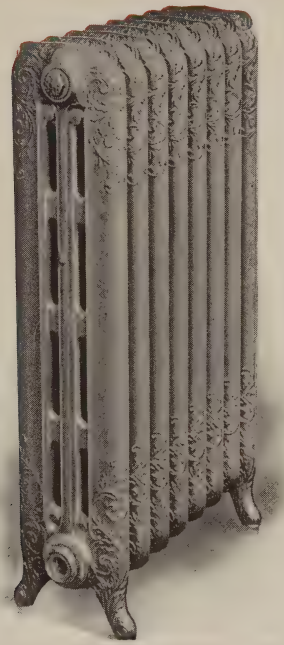
Number Sections	Length $2\frac{1}{3}$ in. per Sec.	Heating Surface—Square Feet				
		45-in. Height. 5 sq. feet per Sec.	38-in. Height. 4 sq. ft. per Sec.	32-in. Height. $3\frac{1}{3}$ sq. ft. per Sec.	26-in. Height. $2\frac{2}{3}$ sq. ft. per Sec.	20-in. Height. 2 sq. ft. per Sec.
2	5	10	8	$6\frac{2}{3}$	$5\frac{1}{3}$	4
3	$7\frac{1}{2}$	15	12	10	8	6
4	10	20	16	$13\frac{1}{3}$	$10\frac{2}{3}$	8
5	$12\frac{1}{2}$	25	20	$16\frac{2}{3}$	$13\frac{1}{3}$	10
6	15	30	24	20	16	12
7	$17\frac{1}{2}$	35	28	$23\frac{1}{3}$	$18\frac{2}{3}$	14
8	20	40	32	$26\frac{2}{3}$	$21\frac{1}{3}$	16
9	$22\frac{1}{2}$	45	36	30	24	18
10	25	50	40	$33\frac{1}{3}$	$26\frac{2}{3}$	20

Above Radiators are tapped solid, as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is $7\frac{1}{4}$ inches wide. Width of legs, $8\frac{1}{2}$ inches.

Distance from floor to center of tapping in single-pipe Steam is 4 inches; for two-pipe Steam, supply, $4\frac{1}{2}$ inches, return, 4 inches; for Water, either supply or return, $4\frac{1}{2}$ inches.

Premier Three-Column Ornamental Steam and Water Radiators



No. of Sections	*Length 2½ in. per Sec.	Heating Surface—Square Feet					
		45-in. Height. 6 sq. ft. per Sec.	38-in. Height. 5 sq. ft. per Sec.	32-in. Height. 4½ sq. ft. per Sec.	26-in. Height. 3⅔ sq. ft. per Sec.	22-in. Height. 3 sq. ft. per Sec.	18-in. Height. 2½ sq. ft. per Sec.
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½

Above Radiators are tapped 2 inches and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 8¾ inches wide. Width of legs, 9⅝ inches.

Distance from floor to center of supply openings is 4 inches for single-pipe Steam; 4½ inches supply, 4 inches return for double-pipe Steam; 4½ inches either supply or return, for Water.

*In estimating length of Radiator, allow ½ inch for each bushing.

Rococo Ornamental Radiators

For Steam and Water

No. of Sections	*Length 2½ in. per Sec.	Heating Surface—Square Feet					
		44 in. Height. 6 sq. ft. per Sec.	38-in. Height. 5 sq. ft. per Sec.	32-in. Height. 4½ sq. ft. per Sec.	26-in. Height. 3¾ sq. ft. per Sec.	22 in. Height. 3 sq. ft. per Sec.	18-in. Height. 2¼ sq. ft. per Sec.
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½

Above Radiators are tapped 2 inches and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

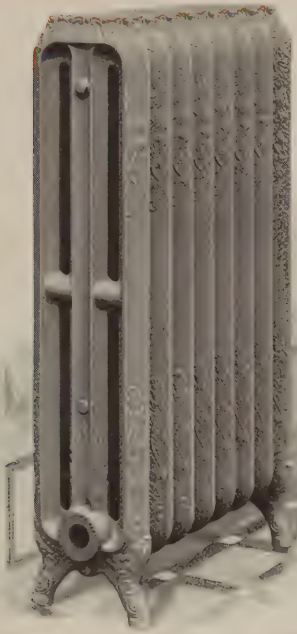
Each section is 9¼ inches wide. Width of legs, 10 inches.

Distance from floor to center of either supply or return tapping is 4½ inches for Water; 4 inches for single-pipe Steam; 4½ inches supply, 4 inches return, for double-pipe Steam.

In 32, 22 and 18-inch Rococo Water Radiators made at Pierce Plant, distance from floor to center of tapping is 4 inches, but when so specially ordered legs can be built up to make distance 4½ inches.

* In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Buffalo Standard Three-Column Orna'l Steam and Water Radiators



No. of Sections	Length 2½ in. per Sec.	Heating Surface — Square Feet						
		44-in. Height. 6 sq. ft. per Sec.	38-in. Height. 5 sq. ft. per Sec.	32-in. Height. 4½ sq. ft. per Sec.	26-in. Height. 3¾ sq. ft. per Sec.	22-in. Height. 3 sq. ft. per Sec.	20-in. Height. 2¾ sq. ft. per Sec.	18-in. Height. 2¼ sq. ft. per Sec.
2	5	12	10	9	7½	6	5½	4½
3	7½	18	15	13½	11¼	9	8¼	6¾
4	10	24	20	18	15	12	11	9
5	12½	30	25	22½	18¾	15	13¾	11¼
6	15	36	30	27	22½	18	16½	13½
7	17½	42	35	31½	26¼	21	19¼	15¾
8	20	48	40	36	30	24	22	18
9	22½	54	45	40½	33¾	27	24¾	20¼
10	25	60	50	45	37½	30	27½	22½

NOTE.—18-inch and 20-inch are made in water pattern only.

Above Radiators are tapped solid, as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 8⅞ inches wide. Width of legs, 9⅛ inches.

Distance from floor to center of tapping in single-pipe Steam is 5 inches; two-pipe steam, supply 5½ inches, return 5 inches; for Water, either supply or return, 5½ inches.

St. Louis Standard Three-Column Ornamental Radiators

For Steam and Water

No. of Sections	Length 2½ in. per Sec.	Heating Surface — Square Feet						
		44-in. Height. 6 sq. ft. per Sec.	38-in. Height. 5 sq. ft. per Sec.	32-in. Height. 4½ sq. ft. per Sec.	26-in. Height. 3¾ sq. ft. per Sec.	22-in. Height. 3 sq. ft. per Sec.	20-in. Height. 2¾ sq. ft. per Sec.	18-in. Height. 2¼ sq. ft. per Sec.
2	5	12	10	9	7½	6	5½	4½
3	7½	18	15	13½	11¼	9	8¼	6¾
4	10	24	20	18	15	12	11	9
5	12½	30	25	22½	18¾	15	13¾	11¼
6	15	36	30	27	22½	18	16½	13½
7	17½	42	35	31½	26¼	21	19¼	15¾
8	20	48	40	36	30	24	22	18
9	22½	54	45	40½	33¾	27	24¾	20¼
10	25	60	50	45	37½	30	27½	22½

Above Radiators are tapped solid, as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 9 inches wide. Width of legs, 9½ inches.

Distance from floor to center of tapping, in single-pipe work, is 5 inches (except 2-inch tapping, in which case distance is 5½ inches); two-pipe Steam, supply 5½ inches, return 5 inches; for Water, either supply or return, 5½ inches.

Rococo Plain Radiators

For Steam and Water

No. of Sections	*Length 2½ in. per Sec.	Heating Surface—Square Feet					
		44 in. Height. 6 sq. ft. per Sec.	38-in. Height. 5 sq. ft. per Sec.	32-in. Height. 4½ sq. ft. per Sec.	26-in. Height. 3¼ sq. ft. per Sec.	22 in. Height. 3 sq. ft. per Sec.	18-in. Height. 2¼ sq. ft. per Sec.
2	5	12	10	9	7½	6	4½
3	7½	18	15	13½	11¼	9	6¾
4	10	24	20	18	15	12	9
5	12½	30	25	22½	18¾	15	11¼
6	15	36	30	27	22½	18	13½
7	17½	42	35	31½	26¼	21	15¾
8	20	48	40	36	30	24	18
9	22½	54	45	40½	33¾	27	20¼
10	25	60	50	45	37½	30	22½

Above Radiators are tapped 2 inches and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

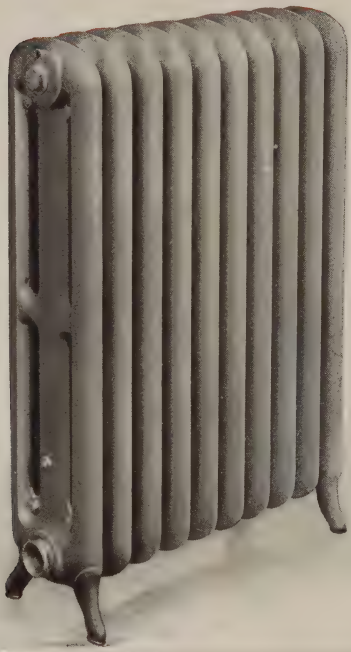
Each section is 9¼ inches wide. Width of legs, 10 inches.

Distance from floor to center of either supply or return tapping is 4½ inches for Water; 4 inches for single-pipe Steam; 4½ inches supply, 4 inches return, for double-pipe Steam.

* In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Peerless Three-Column Radiators

For Steam or Water



No. Sections	*Length 2½ in. per Sec.	Heating Surface, Square Feet.		No. of Sections	*Length 2½ in. per Sec.	Heating Surface, Square Feet.	
		38-in. Height 5 sq. ft per Sec.	26-in. Height. 3¾ sq. ft. per Sec.			38-in. Height. 5 sq. ft. per Sec.	26-in. Height 3¾ sq. ft. per Sec.
2	5	10	7½	7	17½	35	26¼
3	7½	15	11¼	8	20	40	30
4	10	20	15	9	22½	45	33¾
5	12½	25	18¾	10	25	50	37½
6	15	30	22½				

Above Radiators are tapped 2 inches and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 10 inches wide. Width of legs, 10¼ inches.

Distance from floor to center of either supply or return tapping is 4½ inches for Water; 4 inches for single-pipe Steam; 4½ inches supply, 4 inches return, for double-pipe Steam.

* In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Buffalo Standard Three-Column Plain Radiators

For Steam and Water

No. of Sections	Length 2½ in. per Sec.	Heating Surface — Square Feet						
		45-in. Height. 6 sq. ft. per Sec.	38-in. Height. 5 sq. ft. per Sec.	32-in. Height 4½ sq. ft. per Sec.	26-in. Height. 3¾ sq. ft. per Sec.	22-in. Height 3 sq. ft. per Sec.	20-in. Height. 2¾ sq. ft. per Sec.	18-in. Height. 2¼ sq. ft. per Sec.
2	5	12	10	9	7½	6	5½	4½
3	7½	18	15	13½	11¼	9	8¼	6¾
4	10	24	20	18	15	12	11	9
5	12½	30	25	22½	18¾	15	13¾	11¼
6	15	36	30	27	22½	18	16½	13½
7	17½	42	35	31½	26¼	21	19¼	15¾
8	20	48	40	36	30	24	22	18
9	22½	54	45	40½	33¾	27	24¾	20¼
10	25	60	50	45	37½	30	27½	22½

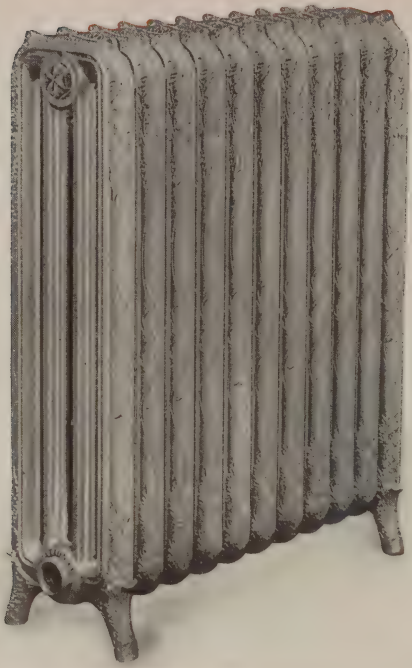
Above Radiators are tapped solid, as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 8⅞ inches wide. Width of legs 9⅛ inches.

Distance from floor to center of tapping in single pipe Steam is 5 inches; two pipe Steam, supply 5½ inches, return 5 inches; for Water, either supply or return, 5½ inches.

National Four-Column Radiators

For Steam or Water



No. of Sections	*Length 2¾ inches per Sec.	Heating Surface — Square Feet: 38-in. Height. 8 sq. ft. per Sec.	32-in. Height. 6⅔ sq. ft. per Sec.	26-in. Height. 5⅓ sq ft. per Sec.	23-in. Height. 4⅔ sq. ft. per Sec.	20-in. Height. 4 sq. ft. per Sec.
2	5½	16	13⅓	10⅔	9⅓	8
3	8¼	24	20	16	14	12
4	11	32	26⅔	21⅓	18⅔	16
5	13¾	40	33⅓	26⅔	23⅓	20
6	16½	48	40	32	28	24
7	19¼	56	46⅔	37⅓	32⅔	28
8	22	64	53⅓	42⅔	37⅓	32
9	24¾	72	60	48	42	36
10	27½	80	66⅔	53⅓	46⅔	40

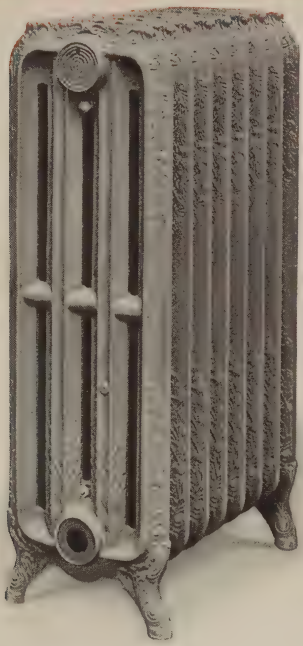
Above Radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 10½ inches wide; width of legs, 11¼ inches.

Distance from center of either supply or return tapping to floor is 4½ inches.

*In estimating *length* of Radiator, *allow ½ inch* for bushing.

Buffalo Standard Four-Column Orna'l Steam or Water Radiators



No. of Sections	Length, 2½-in. per Sec.	Heating Surface — Square Feet						
		44-in. Height. 9 sq. ft. per Sec.	38-in. Height. 8 sq. ft. per Sec.	32-in. Height. 6⅔ sq. ft. per Sec.	26 in. Height. 5⅓ sq. ft. per Sec.	22-in. Height. 4 sq. ft. per Sec.	20-in. Height. 3½ sq. ft. per Sec.	18-in. Height. 3 sq. ft. per Sec
2	5	18	16	13⅓	10⅔	8	7	6
3	7½	27	24	20	16	12	10½	9
4	10	36	32	26⅔	21⅓	16	14	12
5	12½	45	40	33⅓	26⅔	20	17½	15
6	15	54	48	40	32	24	21	18
7	17½	63	56	46⅔	37⅓	28	24½	21
8	20	72	64	53⅓	42⅔	32	28	24
9	22½	81	72	60	48	36	31½	27
10	25	90	80	66⅔	53⅓	40	35	30

Above Radiators are tapped solid as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 11⅝ inches wide. Width of legs, 12 inches.

Distance from floor to center of tapping in single-pipe Steam is 5 inches; two-pipe Steam, supply 5½ inches, return 5 inches; for Water, either supply or return, 5½ inches.

St. Louis Standard Four-Column Orna'l Steam or Water Radiators

No. of Sections	Length, 2½-in. per Sec.	Heating Surface — Square Feet						
		44-in. Height. 9 sq. ft. per Sec.	38-in. Height. 8 sq. ft. per Sec.	32-in. Height. 6⅔ sq. ft. per Sec.	26 in. Height. 5⅓ sq. ft. per Sec.	22-in. Height. 4 sq. ft. per Sec.	20-in. Height. 3⅓ sq. ft. per Sec.	18-in. Height. 3 sq. ft. per Sec.
2	5	18	16	13⅓	10⅔	8	7	6
3	7½	27	24	20	16	12	10½	9
4	10	36	32	26⅔	21⅓	16	14	12
5	12½	45	40	33⅓	26⅔	20	17½	15
6	15	54	48	40	32	24	21	18
7	17½	63	56	46⅔	37⅓	28	24½	21
8	20	72	64	53⅓	42⅔	32	28	24
9	22½	81	72	60	48	36	31½	27
10	25	90	80	66⅔	53⅓	40	35	30

Above Radiators made in 44-inch, 38-inch and 32-inch Heights only. The lower heights are of the Buffalo Standard Four-Column Ornamental pattern.

Above Radiators are tapped solid as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 11¾ inches wide. Width of legs, 12¾ inches.

Distance from floor to center of tapping in single-pipe work, is 5 inches (except 2-inch tapping, in which case distance is 5½ inches); for two-pipe Steam, supply 5½ inches, return 5 inches; for Water, either supply or return, 5½ inches.

Peerless Four-Column Radiators

For Steam or Water

No. of Sections	*Length 2¾ inches per Sec.	Heating Surface — Square Feet				
		38-in. Height. 8 sq. ft. per Sec.	32-in. Height 6⅔ sq. ft. per Sec.	26-in. Height. 5⅓ sq ft. per Sec.	23-in. Height. 4⅔ sq. ft. per Sec.	20-in. Height. 4 sq. ft. per Sec.
2	5½	16	13⅓	10⅔	9⅓	8
3	8¼	24	20	16	14	12
4	11	32	26⅔	21⅓	18⅔	16
5	13¾	40	33⅓	26⅔	23⅓	20
6	16½	48	40	32	28	24
7	19¼	56	46⅔	37⅓	32⅔	28
8	22	64	53⅓	42⅔	37⅓	32
9	24¾	72	60	48	42	36
10	27½	80	66⅔	53⅓	46⅔	40

Above Radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 10½ inches wide; width of legs, 11¼ inches.

Distance from center of either supply or return tapping to floor is 4½ inches.

*In estimating *length* of Radiator, *allow ½ inch* for bushing.

Italian Flue Ornamental Radiators

For Steam and Water

Patented Oct. 20, 1896.

No. of Sections	*Length 3 inches per Sec.	Heating Surface—Square Feet. 38-in. Height. 7 sq. ft. per Sec.	32-in. Height. 5¾ sq. ft. per Sec.	26-in. Height. 4½ sq. ft. per Sec.	20-in Height. 3¼ sq. ft. per Sec
2	6	14	11½	9	6½
3	9	21	17¼	13½	9¼
4	12	28	23	18	13
5	15	35	28¾	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¼	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½

Above Radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 8½ inches wide. Width at legs, 8½ inches.

Distance from floor to center of supply tapping: single-pipe Steam, 4 inches; double-pipe Steam 4½ inches supply, 4 inches return; Water, 4½ inches supply and return.

* In estimating *length* of Radiators, *allow ½ inch* for each bushing.

Zenith Flue Radiators

For Steam and Water

No. of Sections	Length, Inches	Heating Surface – Square Feet			
		38-in. Height. 7 sq. ft. per Sec.	33-in. Height. 6 sq. ft. per Sec.	28-in. Height. 5 sq. ft. per Sec.	23-in. Height. 4 sq. ft. per Sec.
2	4¾	14	12	10	8
3	7⅜	21	18	15	12
4	10⅛	28	24	20	16
5	12¾	35	30	25	20
6	15½	42	36	30	24
7	18⅛	49	42	35	28
8	20⅞	56	48	40	32
9	23½	63	54	45	36
10	26¼	70	60	50	40

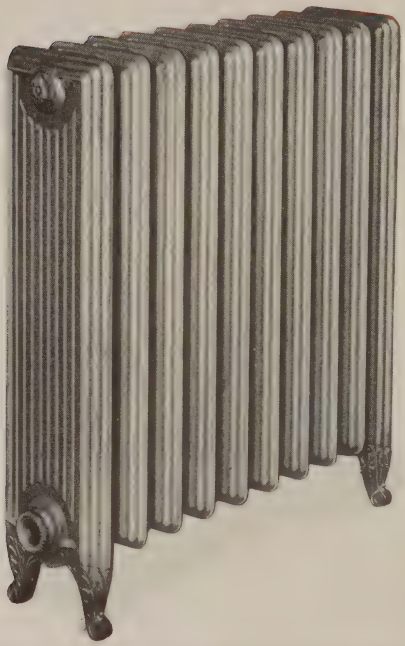
Above Radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 8½ inches wide. Width of legs, 9½ inches.

Distance from floor to center of tapping: single-pipe Steam, 4¼ inches; double-pipe Steam, supply 4¼ inches, return, 4¼ inches; Water, supply and return, 4¾ inches.

Italian Flue Plain Radiators

For Steam and Water



No. of Sections	*Length 3 inches per Sec.	Heating Surface—Square Feet. 38-in. Height. 7 sq. ft. per Sec.	32-in. Height. 5¾ sq. ft. per Sec.	26-in. Height. 4½ sq. ft. per Sec.	20-in. Height. 3¼ sq. ft. per Sec.
2	6	14	11½	9	6½
3	9	21	17¼	13½	9¾
4	12	28	23	18	13
5	15	35	28¾	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¼	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½

Above Radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

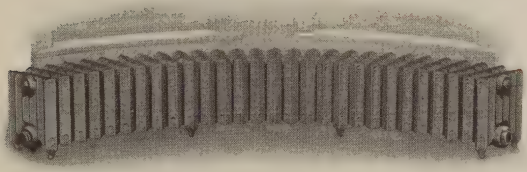
Each section is 8½ inches wide. Width at legs, 8½ inches.

Distance from floor to center of supply tapping: single-pipe Steam, 4 inches; double-pipe Steam 4½ inches supply, 4 inches return; Water, 4½ inches supply and return.

* In estimating *length* of Radiators, *allow ½ inch* for each bushing.

Aetna Flue Radiators

For Steam or Water



These Radiators are regularly furnished in straight form, though the above illustration shows Radiator in *curved* form or shape. For details of this and other patterns furnished in curved shape see page 110.

No. of Sections	*Length, 3 inches per Sec.	Heating Surface—Square Feet				
		20-in. Height. 6 sq. ft. per Sec.	18-in. Height. 5⅓ sq. ft. per Sec.	16-in. Height. 4⅔ sq. ft. per Sec.	14-in. Height. 4 sq. ft. per Sec.	13-in. Height. 3⅔ sq. ft. per Sec.
2	6	12	10⅔	9⅓	8	7⅓
3	9	18	16	14	12	11
4	12	24	21⅓	18⅔	16	14⅔
5	15	30	26⅔	23⅓	20	18⅓
6	18	36	32	28	24	22
7	21	42	37⅓	32⅔	28	25⅔
8	24	48	42⅔	37⅓	32	29⅓
9	27	54	48	42	36	33
10	30	60	53⅓	46⅔	40	36⅔

Above Radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

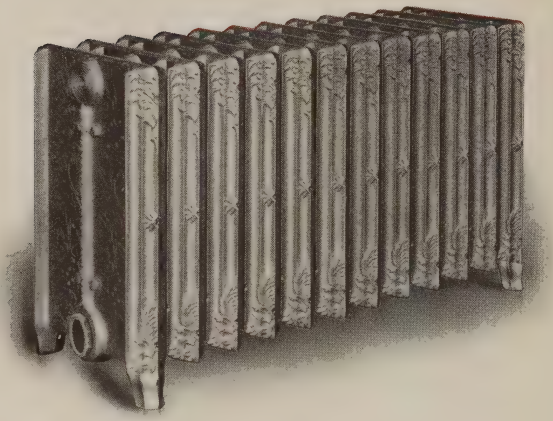
Each section is 12½ inches wide.

Distance from floor to center of tapping: Single-pipe Steam, 2½ inches; double-pipe Steam, 3 inches supply, 2½ inches return; Water, supply and return, 3 inches.

*In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Zenith Window Flue Radiators

For Steam or Water



No. of Sections	Length, inches	Heating Surface—Square Feet			
		20. in. Height. 6 sq. ft. per Sec.	18-in. Height. 5⅓ sq. ft. per Sec.	16-in Height. 4⅔ sq. ft. per Sec.	14-in. Height. 4 sq. ft. per Sec.
2	5¼	12	10⅔	9⅓	8
3	8¼	18	16	14	12
4	11¼	24	21⅓	18⅔	16
5	14¼	30	26⅔	23⅓	20
6	17¼	36	32	28	24
7	20¼	42	37⅓	32⅔	28
8	23¼	48	42⅔	37⅓	32
9	26¼	54	48	42	36
10	29¼	60	53⅓	46⅔	40

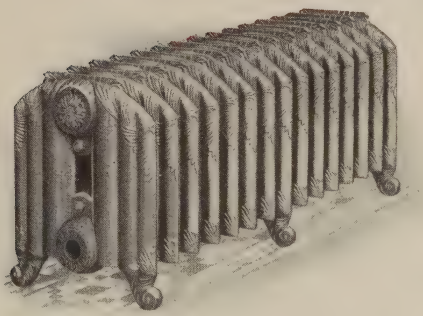
Above Radiators are tapped 2 inches and bushed, as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 12½ inches wide. Width at legs, 12¾ inches.

Distance from floor to center of openings for either supply or return, Steam or Water, is 3 inches.

St. Louis Window Radiators

For Steam or Water



This Radiator is made only in 15-inch height. They are tapped solid as per list on page 114. Each section occupies 2½ inches in length of stack.

Width of section, 11$\frac{5}{16}$ inches. Width of legs, 11¾ inches.

Attention is also invited to our Ætna Flue and Zenith Flue Window Radiators, shown on pages 85 and 86. Also to the list of other low heights of radiators shown on pages 54 and 55, which are especially adapted for placing under windows or in other places where low radiators are required.

Distance from floor to center of tapping on single pipe work is 3 inches (except 2-inch tapping, in which case distance is 3½ inches); for two-pipe steam supply 3½ inches, return 3 inches; for water, either supply or return, 3½ inches.

Italian Orna'l Flue Box-Base

For Steam and Water

No. of Sections	*Length, 3 inches per Sec.	Heating Surface—Square Feet			
		39½-in Height. 7 sq. ft. per Sec.	33½-in. Height. 5¾ sq. ft. per Sec.	27½-in. Height. 4½ sq. ft. per Sec.	21½-in. Height. 3¼ sq. ft. per Sec.
2	6	14	11½	9	6½
3	9	21	17¼	13½	9¾
4	12	28	23	18	13
5	15	35	28¾	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¼	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½

Above Radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

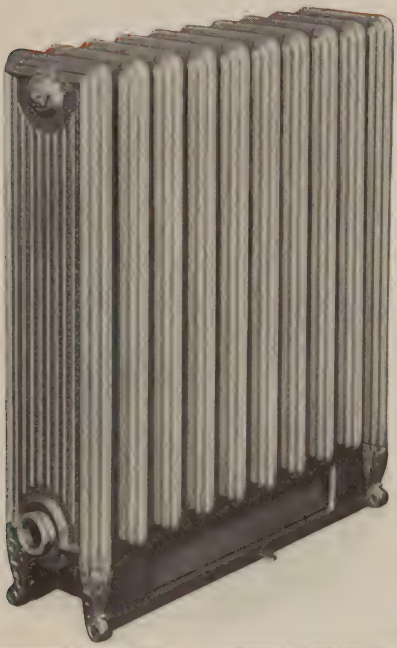
Each section is 8½ inches wide.

Distance from floor to center of tapping: one-pipe Steam, 5½ in.; two-pipe Steam, supply 6 in., return 5½ in.; Water, supply and return, 6 in.

*In estimating *length* of Radiator, *allow ½ inch* for each bushing.

Italian Plain Flue Box-Base Radiators

For Steam and Water



No. of Sections	*Length 3 inches per Sec.	Heating Surface—Square Feet.			
		39½-in. Height. 7 sq. ft. per Sec.	33½-in. Height. 5¼ sq. ft. per Sec.	27½-in. Height. 4½ sq. ft. per Sec.	21½-in. Height. 3¼ sq. ft. per Sec.
2	6	14	11½	9	6½
3	9	21	17¼	13½	9¾
4	12	28	23	18	13
5	15	35	28¾	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¼	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½

Above Radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 8½ inches wide.

Distance from floor to center of tapping: one-pipe Steam, 5½ inches; two-pipe Steam, supply 6 in., return 5½ in.; Water, supply and return 6 in.

* In estimating *length* of Radiators, *allow* ½ *inch* for each bushing.

Italian Flue Box-Base Radiators

Attention is invited to the merits of our Italian Flue Radiator, equipped with Box-Base, for semi-direct heating.

Principle of construction of Base is such that all the air required for ventilation may be taken from without the building by means of air conduit in wall, and distributed through Base into the interior or flue surface of radiator. When outdoor temperature is very low, dampers in Base may be adjusted to any smaller air capacity desired, regulating exactly the varying heating and ventilating requirements of the room, or dampers may be entirely closed, the radiator then acting wholly as a direct radiator.

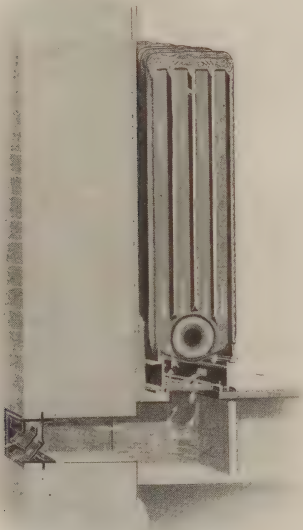


Fig. A

Leading features of the Box-Base are simplicity of construction, ease of operation, capacity for ample supply of air. Base being wholly under the radiator, well recessed, is entirely out of the way and not liable to damage. Front of Base, including dampers, may be easily removed for cleaning purposes. Dampers may be operated merely by slight pressure of the foot.

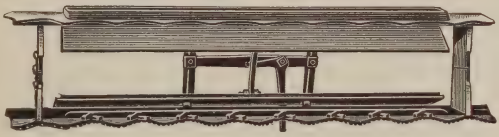
Air Conduit.— Fig. A shows view of radiator and Box-Base with air conduit brought up underneath radiator, through floor. Illustration on page 91 shows Box-Base as arranged for bringing air conduit in at back of radiator, above floor level, in which case a galvanized or sheet-iron sleeve or conduit is necessary to make connection between flange or collar cast around back air inlet of Base and a similar collar on back of wall box.

Italian Flue Box-Bases

Showing Rear Half of Box-Base and Dampers.
Back Air-Inlet Closed.
(Patent applied for.)

Outside measurements of flange or lip around back air-inlet of Box-Base, for attaching sheet-iron sleeve or pipe, are:

Base Section	Inches	Base Section	Inches
12	24¼ x 3¼	7	11⅞ x 3¼
11	21¼ x 3¼	6	9 x 3¼
10	18¼ x 3¼	5	6 x 3¼
9	15¼ x 3¼	4	5⅝ x 3¼
8	14¼ x 3¼	3	2¾ x 3¼



Box-Base, showing Operation of Dampers.
For Bottom Air-Inlet.
(Patent applied for.)

Where air conduit is brought up through floor, under radiator, the opening in floor to be covered by dampers in Base should be:

Base Section	Inches	Base Section	Inches
12	24⅛ x 3⅞	7	11⅝ x 3⅞
11	21⅛ x 3⅞	6	8½ x 3⅞
10	18 x 3⅞	5	6⅛ x 3½
9	15⅛ x 3⅞	4	5½ x 3½
8	14⅜ x 3⅞	3	3¼ x 3½

NOTE. 12-section Box-Base is to be used for radiator of twelve sections, or any EVEN number of sections larger. 11-section Box-Base for radiator of eleven sections, or any ODD number of sections larger. Bottom of back air-inlet opening is one inch above floor level. In ordering Box-Bases to be placed in middle of long Radiators, note that, for instance, to cover six flues or middle sections requires an 8-section Base, to cover seven flues or middle sections requires 9-section Base, etc., etc.

Zenith Flue Box-Base Radiators

For Steam and Water

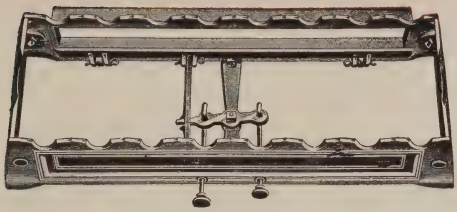
No. of Sections	Length, Inches	Heating Surface—Square Feet			
		38-in. Height. 7 sq ft. per Sec.	33-in. Height. 6 sq. ft. per Sec.	28-in. Height. 5 sq. ft. per Sec.	23-in. Height. 4 sq. ft. per Sec.
2	4¾	14	12	10	8
3	7⅜	21	18	15	12
4	10⅛	28	24	20	16
5	12¾	35	30	25	20
6	15½	42	36	30	24
7	18⅛	49	42	35	28
8	20⅞	56	48	40	32
9	23½	63	54	45	36
10	26¼	70	60	50	40

Above Radiators are tapped 2 inches, and bushed as per list on page 114. For list of *special tappings*, see pages 115 to 118.

Each section is 8½ inches wide Width of legs, 9½ inches.

Distance from floor to center of tapping: single-pipe Steam, 4¼ inches; double-pipe Steam, supply 4¾ inches, return, 4¼ inches; Water, supply and return, 4¾ inches.

Zenith Flue Box-Bases



Box-Base, showing Dampers.

Outside dimensions of flange or lip around back air-inlet of Box-Base for attaching sheet-iron sleeve or pipe:

Base Section	Inches	Base Section	Inches
12	2¾ x 24¾	7	2¾ x 11⅜
11	2¾ x 22 1/16	6	2¾ x 8 11/16
10	2¾ x 19 5/16	5	2¾ x 7⅛
9	2¾ x 16⅝	4	2¾ x 4¾
8	2¾ x 14		

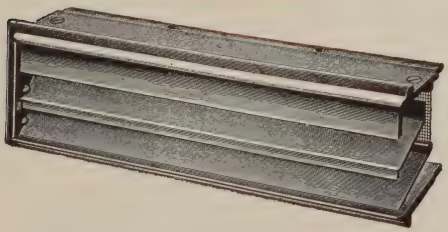
Bottom of back air-inlet opening is ½ inch above floor level.

Where cold-air inlet is brought up through floor, under radiator, the opening in floor to be covered by dampers in base should be:

Base Section	Inches	Base Section	Inches
12	4 x 23¾	7	4 x 10½
11	4 x 21	6	4 x 7½
10	4 x 18¼	5	4 x 6
9	4 x 15½	4	4 x 3½
8	4 x 13		

See note at foot of page 91.

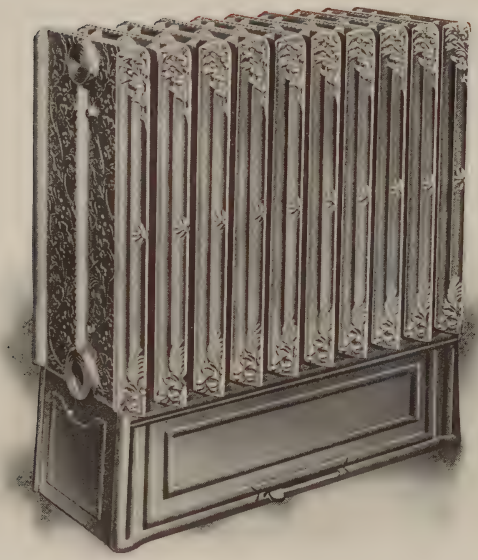
Wall Boxes



These are substantially constructed, and their angle slats and inside copper-wire screen render them storm and insect proof. Outside measurement of Wall Box is 5 x 17½ inches, to conform with brick measure.

Areal Sanitary Box-Base Radiators

For Steam Only



	No. 10	No. 15
Total Height of Radiator and Base .	33 inches	33 inches
Length over all, " " " .	29¼ "	44¼ "
Width of Panel	12½ "	12½ "
" " Base at floor line	12 "	12 "
Heating Surface	80 sq. ft.	120 sq. ft.

Above radiators are tapped solid, as per list on page 114.

Distance from floor to center of supply tapping is 9 inches, return 8½ inches.

Areal Sanitary Box-Base Radiators

Continued

Showing parts of Box Base.

	No. 10	No. 15
Depth of Lip on back of Base . .	1¼ inches	1¼ inches
Length of Lip, outside measurement	24 "	40½ "
Width of Lip, outside measurement	6⅜ "	6⅜ "
Number of square inches in Air opening—*i. e.*, inside measurement of Back opening	23½x6 "	40x6 "

National Two-Column Direct-Indirect Radiators

With Plate Raised

Direct-Indirect Radiators are made in following patterns and heights:

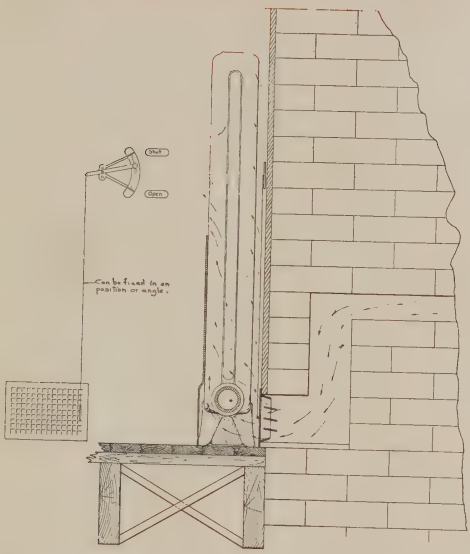
Buffalo Standard Three-Column, Ornamental and Plain, 38-inch and 32-inch (steam).

National Two-Column in 38-inch, 32-inch and 26-inch (steam and water).

Perfection in 38-inch and 26-inch heights (steam).

Rococo Ornamental, 44-inch, 38-inch and 32-inch (steam).

National Single-Column Direct-Indirect



National Single-Column Direct-Indirect Radiator showing Fresh Air Conduit, Register, etc.

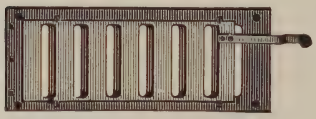
We illustrate above our method of applying the direct-indirect mode to the National Single-Column Radiator, and we have also added to this view outlines of a special handily operated damper attachment, obtainable from manufacturers of registers.

The section of the National Single-Column is 4½ inches wide, and, because of the space between the sections, requires less space between the edge of the radiator and the wall, an inch of space being sufficient. This would make the complete depth of the application 5½ inches.

Another feature of superiority which is equally strong is the fact that the one-piece lifting front-plate (*which is the only plate required*) on the National Single-Column Direct-Indirect, affords a very easy access to the space under the radiator and back of it for cleaning.

Floor Dampers

For Perfection and Rococo Direct-Indirect Radiators



Size No.	Length, inches	To fit under	Air Area, sq. inches
4	8½	4 and 5-section Radiators	12
5	11	6, 7 and 8-section Radiators	20
9	21½	9 and 10-section Radiators	47
10	24	11 and 12-section Radiators	54
12	29¼	13 and 14-section Radiators	67
15	37	15, 16 and 17-section Radiators	88
18	44¾	18, 19 and 20-section Radiators	108
20	50	21 to 30-section Radiators	122

All 8¼ inches wide.

The above Floor Damper is made to set flush, in floor, directly under Radiator. The handle shown in cut projects through the slot in damper door of Radiator, making it possible to introduce or shut off the cold-air supply to meet the varying heating and ventilating requirements of the room.

Rococo Ornamental Dining-Room Radiators

Made in 44-Inch Height Only, Steam and Water

Number	*Length inches	Heating Surface square feet	Number	*Length inches	Heating Surface square feet
1	22½	43½	5	42½	91½
2	27½	55½	6	47½	103½
3	32½	67½	7	52½	115½
4	37½	79½	8	57½	127½

No. 1 is not made in Hot Water pattern.

These Radiators are tapped 2 inches and bushed as per list on page 114. Oven has two shelves 17¼ inches long, 10½ inches wide, with 5 inches space between.

The outside width of oven is 12 inches, and this fact should be borne in mind by fitters when arranging for connections, so that distance from center of tapping to wall shall not be less than 6 inches.

* Allow ½ inch for each bushing.

Perfection Dining-Room Radiators

Made in 38-inch Height only — Steam or Hot Water

Number	*Length, inches	Heating Surface, square feet	Number	*Length, inches	Heating Surface, square feet
00	25	13	4	50	53
0	30	21	5	55	61
1	35	29	6	60	69
2	40	37	7	65	77
3	45	45			

Above Radiators are tapped 1½ inches and bushed as per list on page 114.

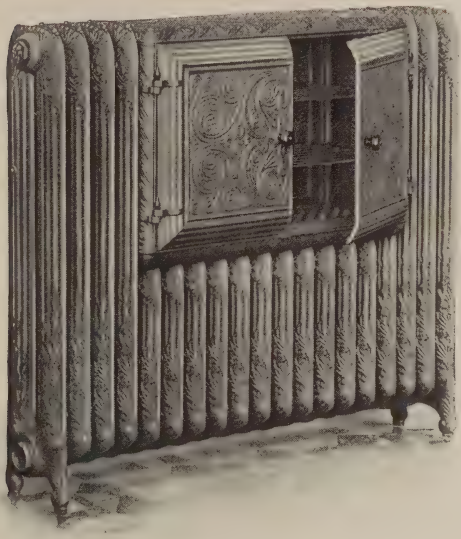
In upper portion of oven are 2 shelves each 20¾ inches long, 13 inches wide, 9 inches space between. In lower portion 1 shelf of same measurement.

The outside width of oven is 13⅝ inches, and this fact should be borne in mind by fitters when arranging for connections, so that distance from center of tapping to wall shall not be less than 6$\frac{13}{16}$ inches.

*In estimating length *allow ½ inch* for each bushing.

Detroit Ornamental Fluted Dining-Room Radiators

Made in 38-Inch Height Only, Steam and Hot Water



Number	*Length, inches	Heating Surface, square feet	Number	*Length, inches	Heating Surface, square feet
1	$30\frac{1}{16}$	33½	6	$53\frac{3}{16}$	76¾
2	$34\frac{11}{16}$	42	7	$57\frac{13}{16}$	85½
3	$39\frac{6}{16}$	50¾	8	$62\frac{7}{16}$	94
4	$43\frac{15}{16}$	59½	9	$67\frac{1}{16}$	102¾
5	$48\frac{9}{16}$	68	10	$71\frac{11}{16}$	111½

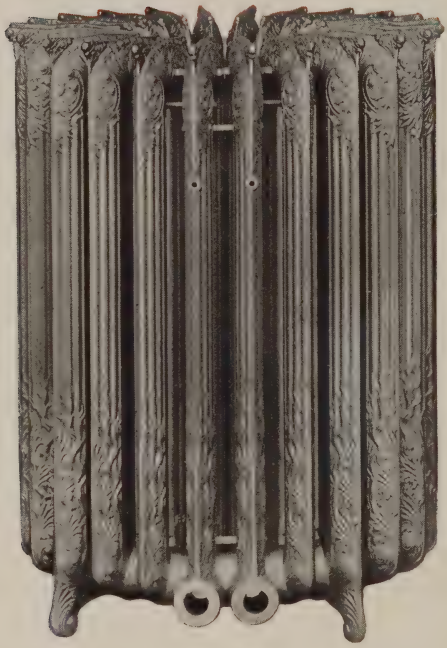
Above Radiators are tapped 2 inches and bushed according to list on page 114.

Oven has three shelves or racks each 25½ inches long, 12⅜ inches wide, with 8¾ inches spaces between.

Outside or extreme depth of oven or closet is 13 inches, which fact should be borne in mind by fitters when arranging for connections, so that distance from wall to center of tapping shall not be less than 6½ inches.

* *Allow ½ inch* for each bushing.

Detroit Ornamental Fluted Wide Top Circular Radiators



Circular Radiators are made in all heights of following patterns:

Buffalo Standard, One, Two and Three-Column Ornamental and Two and Three-Column Plain.

Detroit Ornamental Fluted Wide Top (made in 38-inch Height only).

Ideal.

National Two-Column (steam only).

National and Peerless Single-Column (steam only).

Peerless Two-Column (steam only).

Perfection.

Rococo.

See note page 103.

Circular Radiators

Detroit Ornamental Fluted Wide Top

Steam or Water

In 38-inch height only.

Number	Sections	Heating Surface square feet	Outside Diameter at Legs	Inside Diameter at Legs	List Price
1	12	52	20¾	4½	$26 00
2	16	69	24	8	34 00
3	20	87	26	10	44 00
4	24	104	28	12	52 00
5	28	121	30	14	60 00
6	32	139	33	17	70 00
7	36	156	37	21	78 00

Distance from floor to center of tapping, 3¾ inches.

These Radiators will all be built in halves, and are provided with clamps for holding halves together. They will be arranged with low drip hubs; each half is provided with one feed and one return tapping on opposite sides. Openings are all right hand, tapped 2 inches and bushed according to tapping list on page 114.

Radiators can be made to work as one radiator, single pipe system, by use of elbows and tee. Radiators will be of the Water pattern, but will be fitted with Steam and Water air vent openings.

These Circular Radiators can be fitted with lugs for marble tops when desired, but in cases where lugs are required the order should specifically so state.

NOTE.—We regularly carry a stock of the above pattern of Circular Radiators at our Detroit plant and can ship promptly.

Rococo Steam and Water			Perfection Steam and Water		
No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs	No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs
12	26½	6½	16	25½	6½
14	27¼	7¼	18	27	8
16	28½	8½	20	28½	9½
18	29½	9½	24	32	13
20	30½	10½	26	32½	13½
22	31½	11½	28	33½	14½
24	32½	12½	30	33½	14½
26	33	13	34	38 3/16	19 3/16
28	33½	13½	40	41½	22½
30	35½	15½	44	43½	24½
32	36	15	60	55	36
34	37	17			
36	38	18			
38	39	19			
50	48	28			

Rococo Circular Radiators are made in heights as listed on page 72; Perfection Circular in heights as listed on page 62.

Rococo Circular Radiators are tapped 2 inches, and bushed as per list on page 114. Perfection Circular Radiators are tapped solid 2 inches in steam, 1½ inches in Water, as per list on page 114.

Rococo Circular Radiators are furnished in *two pieces*, forming two separate and distinct Radiators, which are simply bolted together and can be taken apart, placed around a column and again bolted together. (See Note.) For one-pipe work this radiator has two tappings for valves; for two-pipe work, and for Water, it has four tappings for valves—two supply in front and two return in back.

When, however, above Circular Radiators are not intended to be placed around a column or post, they can, when specially ordered, be furnished all in *one piece*, having but one connection for valve for one-pipe work and two connections for valves for two-pipe work.

Distance from floor to center of either supply or return tapping in Rococo and Perfection Circular Radiator is 4 inches.

Note.—Circular Radiators can be made to work as one radiator, single-pipe system, by use of elbows and tee.

National, Ideal and Peerless, for Steam only

National Two-Column, Ideal and Peerless Two-Column Steam			National and Peerless Single-Column Steam		
No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs	No. of Sections	Outside Diameter at Legs	Inside Diameter at Legs
16	23⅛	6⅛	16	20⅛	9⅛
20	25⅞	8⅞	20	22⅞	11⅞
24	28¾	11¾	24	25¾	14¾
25	29⅜	12⅜	25	26⅜	15⅜
28	31½	14½	28	28½	17½
30	32⅞	15⅞	30	29⅞	18⅞
32	34¼	17¼	32	31¼	20¼
33	35	18	33	32	21
36	37 1/16	20 1/16	36	34 1/16	23 1/16
38	38 7/16	21 7/16	38	35 7/16	24 7/16
40	39⅞	22⅞	40	36⅞	25⅞
44	42⅝	25⅝	44	39⅝	28⅝
50	46¾	29¾	50	43¾	32¾

Made in all heights, as listed on pages 56, 59, 63, 64 and 68.

Above Circular Radiators are tapped *solid* 1½ inches, or smaller, as per list on page 114.

Circular Radiators for one-pipe work are practically two separate radiators; they are not joined at the back. (See Note below.)

When for two-pipe work, they are joined at the back with special nipple; both supply and return being at the front, and the supply tapping being at right-hand as you face the radiator.

Distance from the floor to the center of either supply or return tapping is 4½ inches.

NOTE.—They can be made to work as one radiator on single-pipe system by use of elbows and tee.

Buffalo Standard Steam and Water

Ornamental, Single-Column			Ornamental and Plain Two-Column			Ornamental and Plain Three-Column		
No. Sections	Inside Diam. at Legs	Outside Diam. at Legs	No. Sections	Inside Diam. at Legs	Outside Diam. at Legs	No. Sections	Inside Diam. at Legs	Outside Diam. at Legs
18	9½	20½	20	10	27	24	12⅞	31⅛
20	11½	22½	22	11⅜	28⅜	26	14⅛	32⅜
22	12¼	23¼	24	12¾	29¾	28	15⅜	33⅝
24	13¼	24¼	26	14⅛	31⅛	30	16⅝	34⅞
26	13¾	24¾	28	15½	32½	32	17⅞	36⅛
28	15⅛	26⅛	30	16⅞	33⅞	34	19¼	37½
30	16½	27½	32	18⅜	35⅜	...	....	....
32	17¾	28¾	.	....	....	...	....	....
34	19¼	30¼	...	....	....	...	....	....

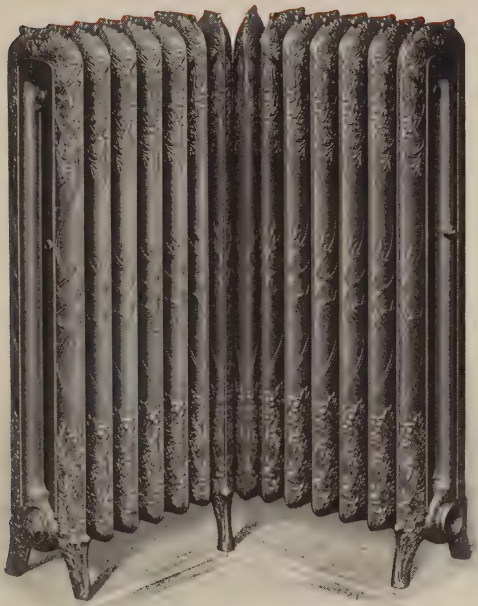
Above Circular Radiators are made in all heights, as listed on pages 57, 65, 70, 73 and 77.

Above Radiators are tapped solid 1½ inches or less, as per list on page 114.

Distance from floor to center of either supply or return tapping in above Circular Radiators is 5½ inches in Single-Column; 4⅞ inches in Two-Column; 5⅛ inches in Three-Column.

For two-pipe work supply and return will be tapped diametrically opposite. We can tap supply and return on one side with one loop intervening, if so desired.

National Two-Column Corner Radiators



Corner Radiators are made in all heights of following patterns:

Aetna Flue.

Buffalo Standard One, Two and Three-Column Ornamental and Two and Three-Column Plain.

Ideal.

Italian Flue.

National and Peerless Single-Column (steam only.)

National Two-Column (steam only.)

Peerless Two-Column (steam only.)

Perfection.

Rococo, Ornamental and Plain.

Verona.

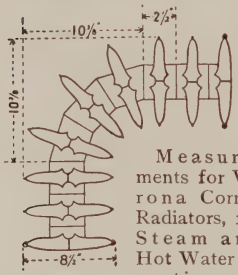
Corner Radiator Measurements

In ordering Curved and Corner or Angle Radiators, specify the exact radius or angle of the baseboard at floor within which the radiator is to be placed. All orders for Curved Radiators should be accompanied by template.

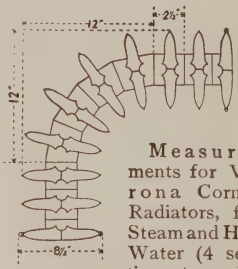
For method of arriving at exact radius or angle, see drawings and instructions on pages 188 to 190.

In all heights of Curved and Corner Steam Radiators, owing to the difference in heights of supply and return end tappings from floor, we must know (by sketch) which end of radiator is for supply and which for return, as you face the inside of angle or curve.

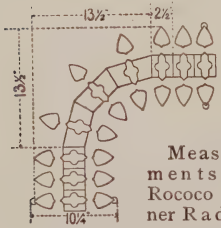
In estimating *length* of Radiators, *allow ½ inch* for each bushing, except in Buffalo Standard One, Two and Three-Column, which are tapped solid.



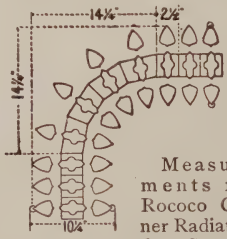
Measurements for Verona Corner Radiators, for Steam and Hot Water (3 sections to make corner). For heights and heating surfaces of sections, see page 61.



Measurements for Verona Corner Radiators, for Steam and Hot Water (4 sections to make corner). For heights and heating surfaces or sections, see page 61.



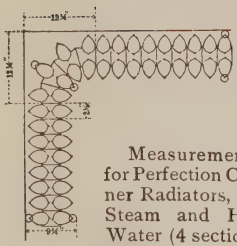
Measurements for Rococo Corner Radiators, for Steam and Hot Water (3 sections to make corner). For heights and heating surfaces of sections, see page 72.



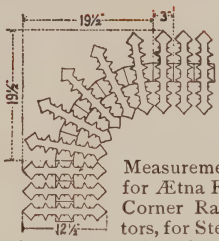
Measurements for Rococo Corner Radiators for Steam and Hot Water (4 sections to make corner). For heights and heating surfaces of sections, see page 72.

Corner Radiator Measurements

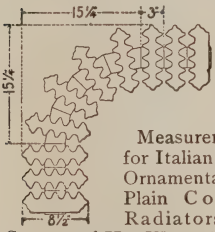
Continued



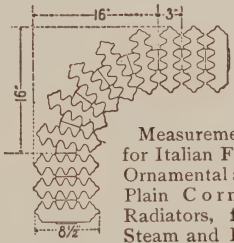
Measurements for Perfection Corner Radiators, for Steam and Hot Water (4 sections to make corner). For heights and heating surfaces of sections, see page 62.



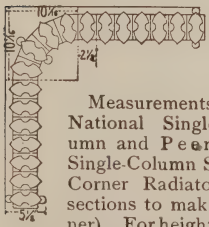
Measurements for Ætna Flue Corner Radiators, for Steam or Hot Water (5 sections to make corner). For heights and heating surfaces of sections, see page 85.



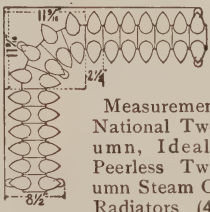
Measurements for Italian Flue Ornamental and Plain Corner Radiators, for Steam and Hot Water (4 sections to make corner). For heights and heating surfaces of sections, see pages 82 and 84.



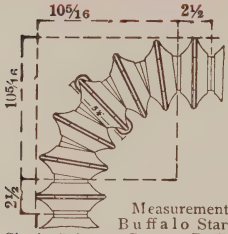
Measurements for Italian Flue, Ornamental and Plain Corner Radiators, for Steam and Hot Water (5 sections to make corner). For heights and heating surfaces of sections, see pages 82 and 84.



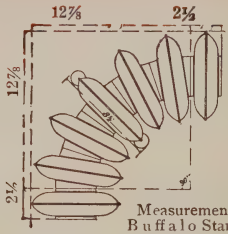
Measurements for National Single-Column and Peerless Single-Column Steam Corner Radiators (4 sections to make corner). For heights and heating surfaces of sections, see pages 56 and 59.



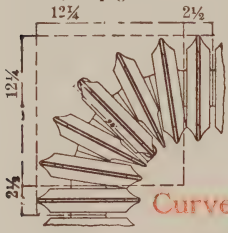
Measurements for National Two-Column, Ideal and Peerless Two-Column Steam Corner Radiators (4 sections to make corner). For heights and heating surfaces of sections, see pages 63, 64 and 68.



Measurements for Buffalo Standard Single-Column Corner Radiators for Steam and Hot Water (5 sections to make corner). For heights and heating surfaces of sections, see page 57.

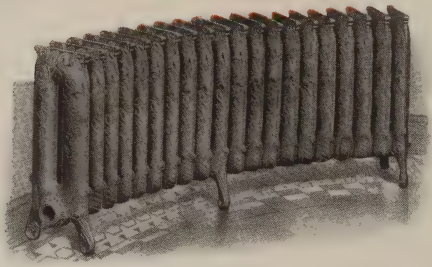


Measurements for Buffalo Standard Two-Column Corner Radiators for Steam and Hot-Water (5 sections to make corner). For heights and heating surfaces of sections, see page 65



Measurements for Buffalo Standard Three-Column Corner Radiators, made in 44 and 38-inch heights of Hot Water (5 sections to make corner). All other heights of Hot Water and all heights of Steam made in *curved* shape to fit corner. For heights and heating surface of sections, see pages 73 and 77.

Curved Radiators



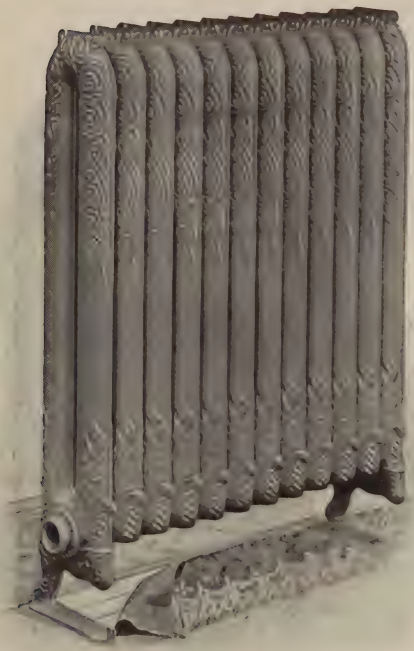
Perfection Ornamental Curved Radiator.

Curved Radiators are made in all heights of patterns as follows:
Buffalo Standard One, Two and Three-Column, Ornamental, and Two and Three-Column, Plain.
Ideal. Peerless Two-Column (steam only).
Italian Flue. National Two-Column (steam only).
National and Peerless Single-Column (steam only).
Verona. Perfection. Rococo, Ornamental and Plain.

NOTE. In ordering Curved or Corner Radiators, specify the exact radius or angle of the base-board within which the Radiator is to be placed. For method of arriving at exact radius or angle, see drawings and instructions on pages 188 to 190.

Perfection Ornamental Radiator

Equipped with Detachable Carpet Feet



Furnished for all heights of Perfection Steam and Water Radiators. Carpet feet increase distance from floor to center of supply tapping to 6½ inches for single-pipe Steam; supply 7 inches, return 6½ inches, for double-pipe Steam; 7 inches, either supply or return, for Water.

Also furnished for all heights of DETROIT PLANT Rococo, for Steam and Water; distance from floor to center of single-pipe Steam tapping, 5 inches; for two-pipe Steam, 5½ inches supply, 5 inches return; for Water, 5½ inches, either supply or return.

National Two-Column Window Radiators

Window Radiators are made in all heights; patterns as follows:

Buffalo Standard Three-Column Ornamental and Plain.

Ideal.

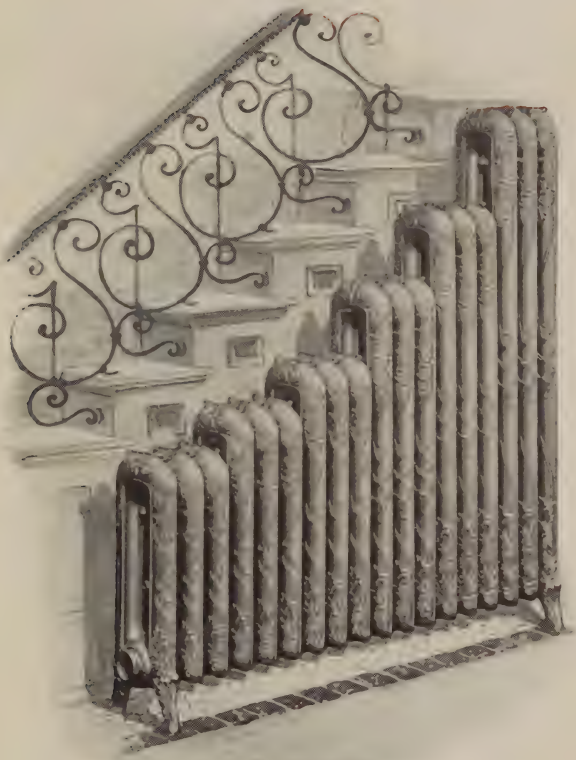
National and Peerless Single-Column (steam only).

National Two-Column (steam only).

Peerless Two-Column (steam only).

Perfection.

National Two-Column Stairway Radiators



Stairway Radiators are made in all heights in following patterns:

Ideal.
National and Peerless Single-Column.
National Two-Column.
Peerless Two-Column.
Perfection.

Tapping List of American Radiators

Steam

ONE-PIPE WORK

Radiators containing 24 square feet and under	1 inch
Above 24, but not exceeding 60 feet	1¼ inch
Above 60, but not exceeding 100 feet	1½ inch
Above 100 square feet	2 inch

TWO-PIPE WORK

Radiators containing 48 square feet and under	1 x ¾ inch
Above 48, but not exceeding 96 feet	1¼ x 1 inch
Above 96 square feet	1½ x 1¼ inch

Hot Water

TAPPED FOR SUPPLY AND RETURN

Radiators containing 40 square feet and under	1 inch
Above 40, but not exceeding 72 square feet	1¼ inch
Above 72 square feet	1½ inch

All openings will have right-hand threads, unless otherwise ordered.
All air-valve tappings are regularly made ⅛ inch.

Measurements of American Radiators

Width, inches		Name of Radiator	Length occupied in Stack by each Section inches
Legs	Intermediate Sections	Directs	
12½	12½	Aetna Flue	*3
12	12	Areal	
8½	7⅜	Astro	*2½
5½	5⅛	Buffalo Single Column	2½
8½	7¼	Buffalo Two-Column	2½
9⅛	8⅞	Buffalo Three-Column	2½
12	11⅝	Buffalo Four Column	2½
8½	7⅜	Ideal	*2½
8½	8½	Italian Flue	*3
5½	4½	National Single-Column	*2½
8½	7⅜	National Two-Column	*2½
11¼	10½	National Four-Column	*2¾
5½	4½	Peerless Single-Column	*2½
8½	7⅜	Peerless Two-Column	*2½
10¼	10	Peerless Three-Column	*2½
11¼	10½	Peerless Four-Column	*2¾
9¼	7¼	Perfection	*2½
10	9¼	Rococo Ornamental and Plain	*2½
6⅛	5½	St. Louis Single-Column	2½
8½	7	St. Louis Two-Column	2½
9½	9	St. Louis Three-Column	2½
12¾	11¾	St Louis Four-Column	2½
11¾	11 5/16	St. Louis Window	2½
8½	8	Verona	*2½
9½	8½	Zenith Flue	
12¾	12½	Zenith Window	

*To length of these Radiators add ½ inch for each bushing.

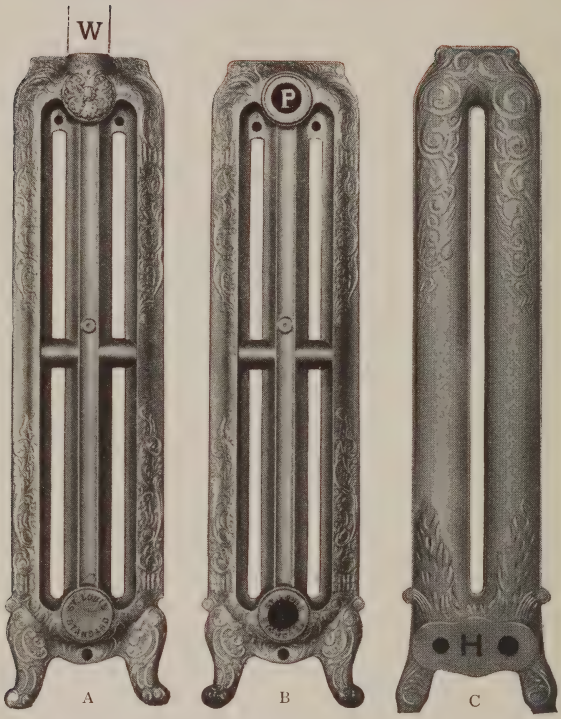
Top Feed, Bottom Return at Same End, for Water.

The figures given below indicate the distance between centers of upper and lower tappings, top feed and bottom return at same end, in the various patterns of Water Radiators.

(See cut "B" on page 116.)

Heights, Inches	45 44	38	33 32 or 30	28 26-24	23 or 22	20	18
Aetna Flue	....	....	....	....	....	15 1/8	13 1/8
Astro	38 55/64	31 3/32	25 9/32	19 1/2	16 9/16	13 5/8	....
Buffalo Single-Col'mn	35 5/8	30 1/16	24 3/16	18 3/16	14 1/8	12 1/16	10 3/16
Buffalo Two-Column	38 1/2	31 15/16	25 15/16	19 13/16	13 15/16	....	....
Buffalo Three-Col'mn	35 7/8	30 5/32	24 3/16	18 1/4	14 7/16	12	10 3/8
Buffalo Four-Column	35 5/8	29 9/16	23 15/16	17 11/16	13 15/16	11 15/16	10 1/16
Italian Flue	....	31 5/16	25 7/16	19 1/2	....	13 9/16	....
National Single Column	....	31 3/32	25 9/32	19 1/2	16 9/16	13 5/8	....
National Two-Col'mn	38 55/64	31 3/32	25 9/32	19 1/2	16 9/16	13 5/8	....
National Four-Col'mn	....	30 59/64	25 9/32	19 1/2	16 9/16	13 5/8	....
Peerless Single-Col.	....	31 3/32	25 9/32	19 1/2	16 9/16	13 5/8	....
Peerless Two-Col'mn	38 55/64	31 3/32	25 9/32	19 1/2	16 9/16	13 5/8	....
Peerless Three-Column	35 9/16	31 3/32	25 9/32	19 1/2	15 3/16	....	11 3/16
Peerless Four-Col'mn	....	30 59/64	25 9/32	19 1/2	16 9/16	13 5/8	....
Perfection	39 1/16	31 5/8	26	20 1/4	....	14 1/4	....
Premier Three-Col.	38 3/32	31 3/32	25 3/32	19 3/32	15 3/32	....	....
Rococo Ornamental and Plain (Detroit)	35 1/4	31	23 3/4	18	14 1/16	....	10 1/4
Rococo Ornamental (Pierce)	35 9/16	31 3/32	25 9/32	19 1/2	15 3/16	....	11 3/16
Rococo Ornamental (Titusville)	....	31	....	....	....	....	...
St. Louis Single-Column	36 1/8	30 1/8	24 3/8	18 1/2	...	....	....
St. Louis Two-Col'mn	38 11/16	31 11/16	25 3/4	19 1/8	....	13 3/4	....
St. Louis Three-Column	36	30 1/8	24 1/8	18 5/16	14 1/2	12 9/16	10 3/16
St. Louis Four Col'mn	35 9/16	30 1/8	24	17 3/4	13 3/4	11 3/4	9 3/4
Verona	....	31 5/16	25 3/8	19 1/2	....	13 1/2	....
Zenith Flue	...	31	26	20 7/8	16	....	....
Zenith Window	....	....	....	....	....	15 3/8	13 3/8

Top of each Ætna Flue, Astro, Italian Flue, National Two and Four-Column, Peerless Two, Three and Four Column, Perfection, Premier, Rococo and Verona Hot-Water leg section has plug, which can be taken out to make top connection when desired.



A — Tapping at top of section. B — Top and bottom tappings, same end, for water. C — Supply and return tappings at bottom of same end, for steam

Tappings for Supply and Return at Bottom of Same End, for Steam

(See Illustration "C.")

At Detroit Plant

Can be furnished in all heights of Verona, Perfection, Rococo and Italian Flue Radiators, for Steam.

At Detroit Plant — Continued

Both tappings are 1½ inches or smaller, according to list on page 114.

Distance between centers of tappings is 4⅛ inches (except where Adjustable High Legs are used), distance from floor to center of either tapping is 4 inches (except in Perfection Radiators, distance between centers is 3⅞ inches; distance from floor to center of either tapping is 3⅞ inches.)

Supply tapping can be made at either right or left hand, as you face tappings, by merely changing location of bushings.

At Pierce Plant

Can be furnished in all heights of National Two-Column, Ideal and Peerless Two-Column Steam Radiators.

Both tappings are *solid*, according to list on page 114.

Distance between centers of tappings is 3¾ inches; distance from floor to center of either tapping is 4½ inches.

When not ordered to the contrary, the supply will always be at the right hand as you face the tappings.

At St. Louis Plant

Can be furnished in all heights of Three and Four-Column Radiators, for steam. Both tappings are solid, according to list on page 114.

Centers of "H" Tapping from Floor in St. Louis Standard Three and Four-Column.

Supply		Return	
Size of Opening, Inches	Distance from Floor, Inches	Size of Opening, Inches	Distance from Floor, Inches
1½	5¾	1½	5¾
1¼	5¾	1¼	5⅜
1	5¾	1	5½
¾	5¾	¾	5⅜

At Standard Plant

Cannot be furnished in Three-Column with larger than 1½-inch opening. The Two and Four-Column patterns can be tapped at "H" (see cut "C", page 116) up to 2 inches.

Centers of "H" Tapping from Floor in Three and Four-Column Radiators.

Supply		Return	
Size of Opening Inches	Distance from Floor, Inches	Size of Opening Inches	Distance from Floor, Inches
1½	5¾	1½	5¾
1¼	5¾	1¼	5⅝
1	5¾	1	5½
¾	5¾	¾	5⅜

Centers of "H" Tapping from Floor in Two-Column are 1 inch less than above measurements.

Tapping at Extreme Top or Bottom of First or Second Section of Stack

(See Illustration "A" Page 116)

At Detroit Plant

When so ordered, can place special tapping of 1½-inch or smaller at extreme top of first or second section of stack, or at bottom of second section, in any pattern made at Detroit Plant, except on the top of second section of the Italian Flue pattern, which can only be tapped 1 inch or smaller.

At Standard Plant

When so ordered, can place special tapping of 1½-inch or smaller at extreme top of leg-section of all patterns made at Standard Plant.

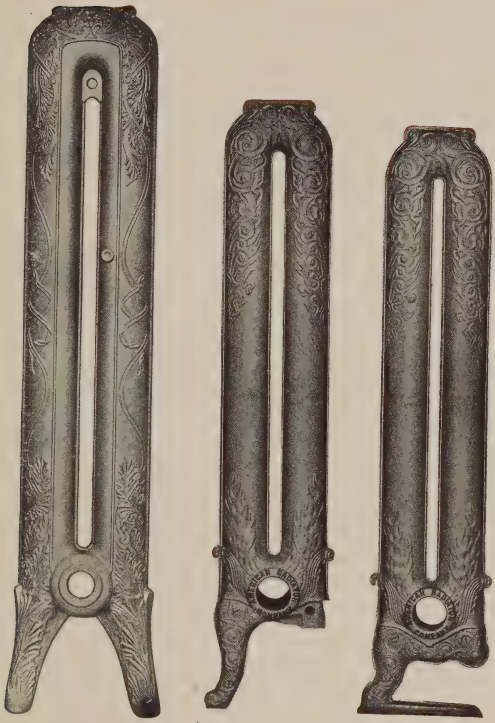
At Pierce Plant

When so ordered, can place special tapping of 1 inch or smaller at extreme top of first or second section, or at bottom of second section of stack in any pattern made at Pierce Plant.

At St. Louis Plant

When so ordered, can place special tapping of 1½ inch or smaller at extreme top of first or second section of stack, or at bottom of second section, in St. Louis Three and Four-Column Radiators.

Radiators with Special Legs



D E F

D — Extra high solid legs. E — Detachable high legs. F — Carpet Foot.

Detachable High Legs

(Patent applied for)

As shown on this page are made, upon special order, at Detroit Plant, for all heights of Verona, Perfection, and Rococo Radiators.

These legs can be furnished in any height desired, so that center of supply tapping will be 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½, or 9 inches from floor.

The Ætna Flue Radiators can also be furnished with Detachable High Legs, to make distance from floor to center of supply tapping 3, 3⅓, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½, or 9 inches.

These legs are detached and shipped separately, thus removing possibility of breakage.

The size of each pair of Detachable Legs is cut on the inside of each half, as "4 x 4½." These numbers show the distance which the legs will bring the center of the tapping from floor. For example, the 4 x 4½ legs are the standard height legs and bring both tappings of a Water Radiator 4½ inches from floor; in a double-pipe steam job, the supply would be 4½ inches and the return 4 inches from floor; in a single-pipe steam job the supply or low drip end would be 4 inches from floor.

In ordering radiators having Detachable Legs, always give distance from floor to center of what is to be the supply tapping of radiator; and when for Steam Radiators, be sure to state whether for one or two-pipe job.

Extra High Solid Legs

At Pierce Plant. Extra High Solid Legs as shown on page 119 can be furnished, on special order only, in all heights of National Two-Column and Peerless Two-Column Steam and Hot-Water Radiators, Ideal Steam and National Single-Column Steam, so that distance from floor to center of tapping will be 5, 5½, 6, 6½, 7, 7½, or 8 inches, as ordered.

All Radiators made at Pierce Plant with extra high solid Legs are tapped *solid*, according to list on page 114.

At Standard Plant. Furnished, on special order only, in any of Standard Plant pattern Radiators, so that distance from floor to center of supply tapping will be 6, 6½, 7, 7½, 8, 8½, 9, 9½, or 10 inches as ordered.

At Titusville Plant. Furnished, on special order only, in all heights of all direct Radiators made at Titusville Plant, so that distance from floor to center of tapping will be 5, 5½, 6, 6½, 7, 7½, 8, 8½, and 9 inches, as ordered, (except Zenith in 38-in. height, which cannot be furnished with legs higher than 7½ inches.)

At St. Louis Plant. Furnished, on special order only, in all heights of St. Louis Plant Radiators except Single-Column and Window, so that distance from floor to center of tapping will be 5, 5½, 6, 6½, 7, 7½, and 8 inches, as ordered.

NOTE.—In ordering Radiators having extra high solid legs, always give distance required from floor to center of what is to be the supply tapping of Radiator; and when for steam, be sure to state whether for one or two-pipe work.

Pedestals

Made at Pierce Plant

Pedestals to fit under legs of all styles and heights of any of our Direct Radiators can be furnished in the following heights: ½, ¾, 1, 1¼, 1½, 1¾, 2, 2¼, 2½, 3, 3½, 4, 4½ and 5 inches.

Made at Detroit Plant

Pedestals to fit under legs of all styles and heights of any of our Direct Radiators can be furnished in the following heights: 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½ and 9 inches.

Saddles

Saddle for Steam Radiator

Saddle for Hot-Water Radiator

These cuts show cast-iron Saddles, which fit between tops of sections of Radiators of following patterns:

Ideal; National and Peerless Single-Column; National Two-Column; Peerless Two-Column; Rococo Ornamental and Peerless Three-Column; National and Peerless Four-Column.

They afford a rest or support upon which marble tops can be placed. Two of these Saddles are usually sufficient for a radiator, but in the case of a radiator of 15 sections or more it is advisable to use three Saddles — one in the center.

We are also prepared to furnish cast-iron Saddles for Zenith Window Flue Radiators.

Lugs for Marble Top

The following patterns are, when so specially ordered, arranged with lugs on top of leg sections for holding marble top: Italian Flue; Perfection; Rococo; Verona.

Wrenches

On the inside of each right and left-hand threaded nipple, as furnished with radiators made at our DETROIT PLANT, are cast two heavy projecting lugs, so that an ordinary piece of bar iron flattened at one end, the length of nipple, can be inserted to any desired point in the radiator, and by applying wrench to bar the nipple can be unscrewed and one or more sections may be taken out independent of all the others in the stack. Made in two sizes, one for Steam, the other for Hot-Water nipples.

On a one-pipe job for right and left-hand threaded construction radiator, the supply leg section is threaded right hand on inside and the blank leg section threaded left hand on inside. On a two pipe job, feed section is threaded left-hand inside, return is threaded right-hand inside. Feed sections for right and left-hand threaded Water radiators are always threaded left hand on inside, and return sections right hand thread on inside.

These drop-forged steel wrenches, made especially for assembling Indirect Radiators connected with right and left-hand threaded nipple having hexagon nut at center, are a great convenience, and we would recommend our customers to use them in preference to any other. They are made in two sizes, for 1½ and 2-inch nipple openings.

Concealed Brackets

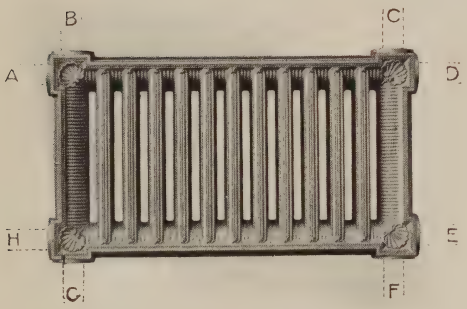
It is sometimes necessary to erect radiators in such manner that they shall not only closely hug the wall, but also be elevated above the floor. Hitherto it has in some such cases been necessary to use the old pipe-coils, but their unsightliness and liability to be forced out of alignment have prevented their use in the better class of buildings. The Concealed Brackets here shown furnish simple means of satisfying this demand. They are made for supporting Single, Two Column and Three-Column Direct Radiators of all patterns made by us. Distance from wall to center of tapping in radiator is, in the Single-Column, 3 inches; Two-Column, 5 inches; Three-Column, 5¾ inches. A set consists of one each top and bottom support as shown in illustration. Ordinarily two sets will support a medium size of radiator.

Top Guide.

Bottom Support.

Colonial Wall Radiators

For Steam or Water



The Colonial Wall Radiator has an extreme width of about 2⅝ inches (or 3½ inches including bracket projection.)

Sizes and Measurements

The Colonial Wall Radiator is made in three sizes of sections:

Extra large size, 29 inches long, 13¼ inches wide, 2⅝ inches thick, contains nine square feet of heating surface.

Standard size, 23 inches long, 13¼ inches wide, 2⅝ inches thick, contains seven square feet of heating surface.

Small size, 16¾ inches long, 13¼ inches wide, 2⅝ inches thick, contains five square feet of heating surface.

Sections are connected or assembled with 1½-inch right and left-hand threaded internal nipples.

On the inside of each of these right and left-hand threaded internal nipples are cast two heavy projecting lugs, so that an ordinary piece of 1⅛-inch bar-iron, flattened at one end, the length of nipple, can be inserted to any desired point in the Radiator, and by applying wrench to bar the nipple can be screwed or unscrewed and one or more sections may be added to or taken out independently of all the others in the stack. We furnish these bars or wrenches, in 4-ft. length, at a nominal charge—see page 122.

For convenience in shipping and handling, 5-ft. Radiators are not assembled into stacks larger than four sections; 7-ft. into three sections; and 9-ft. into two sections. When fitter intends to erect a stack consisting of more sections than above mentioned, or when the sections or stacks are to be set in rows or series (as shown by illustrations on following pages) we provide a right and left-hand threaded nipple *having hexagon nut at center*, enabling the fitter to easily connect the stacks or rows on the job.

Directions for Ordering

Stocks of these sections are regularly carried by us, made up in two styles of tappings—horizontal and vertical. In ordering, it is necessary to state which arrangement of the sections is desired, and this can conveniently be done by giving the Figure number as shown by illustrations on following pages. These illustrations cover the more general forms of erection. Where other arrangement of sections is desired, customer will please send sketch showing exactly what is required. Customers will also clearly specify which of the following brackets will be required.

Footed Vertical Brackets "J"

To fit over a 9½-in. high base-board or skirting, and for supporting Colonial Wall Radiators, erected vertically.

With each "J" Bracket we furnish one ¼-inch stove bolt and one button, by means of which Radiator is held in position.

Height from floor to center of supply or return end of lowest tapping:

No. J—1 Bracket	9½ in.
No. J—2 Bracket	7½ in.
No. J—3 Bracket	5½ in.

Footed Horizontal Brackets "K"

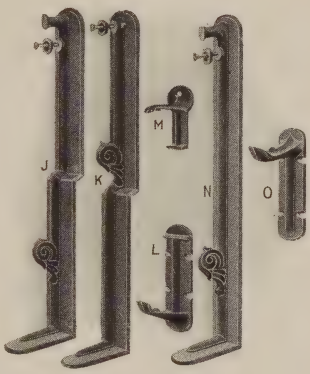
To fit over base-board or skirting, and for supporting Colonial Wall Radiators, erected horizontally.

With each "K" Bracket we furnish one ¼-inch stove bolt and one button. Height from floor to center of supply or return end of lowest tapping:

No. K—1 Bracket	will fit over	11½-inch	high	base-board	or	skirting		16 in.
No. K—2 Bracket	" "	9½	"	"	"	"	"	14 in.
No. K—3 Bracket	" "	7½	"	"	"	"	"	12 in.
No. K—4 Bracket	" "	5½	"	"	"	"	"	10 in.
No. K—5 Bracket	" "	3½	"	"	"	"	"	8 in.
No. K—6 Bracket	" "	1½	"	"	"	"	"	6 in.

Bracket "L"

Screwed to wall, base-board or wainscoting, and supports radiators set either horizontally or vertically. The "L" Bracket is slotted for four wood screws — not furnished by us. Each section requires for its proper support one "L" and one "M" Bracket.



Bracket "M"

Screwed to wall, base-board or wainscoting, and intended to be used as a guide or to hold in position radiator supported by Bracket "L" or "O." Each section requires for its proper support one "L" or "O" and one "M" Bracket. The "M" Bracket is slotted for two wood screws — not supplied by us.

Bracket "N"

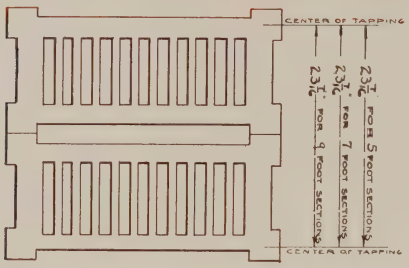
Is a straight, right-angle Bracket, without off-set, for supporting Colonial Wall Radiators, erected vertically or horizontally; height from floor to center of end tapping bosses, 5½ inches. With each "N" Bracket we furnish one ¼-inch stove bolt and one button.

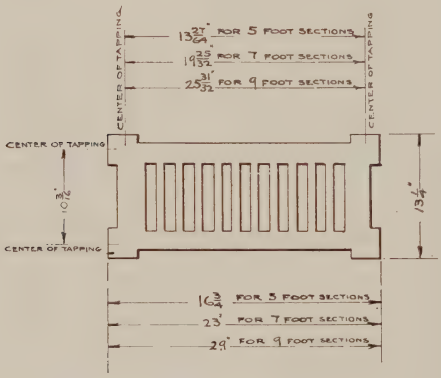
Bracket "O"

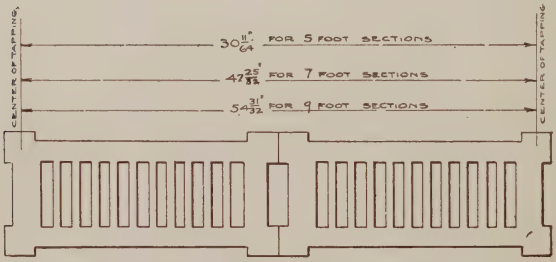
Screwed to wall, base-board or wainscoting, and supports underneath section set either horizontally or vertically. Should be used in connection with "M" Bracket for top guide. The "O" Bracket is slotted for four wood screws — not supplied by us.

NOTE.—In ordering buttons and stove bolts separately from brackets, it is necessary to state for which bracket they are wanted, as different lengths of bolts are used for the different brackets.

Colonial Wall Radiator Measurements







All Colonial Wall Radiators are tapped 1½ inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 114.

Fig. 3. Horizontal
One and Two-pipe Steam

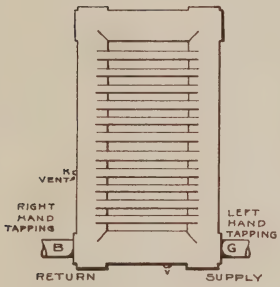


Fig. 4. Vertical
One and Two-pipe Steam

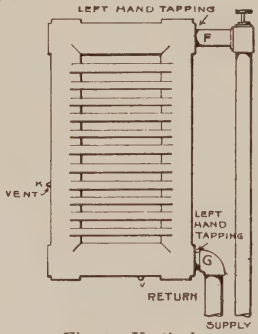


Fig. 6. Vertical
One and Two-pipe Steam

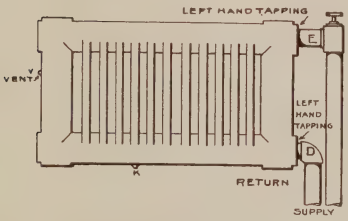


Fig. 5. Horizontal
One and Two-pipe Steam

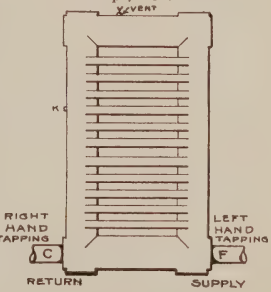


Fig. 8. Vertical
Water

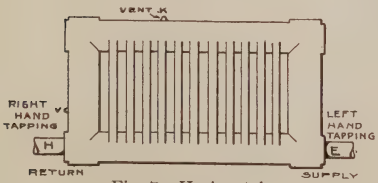


Fig. 7. Horizontal
Water

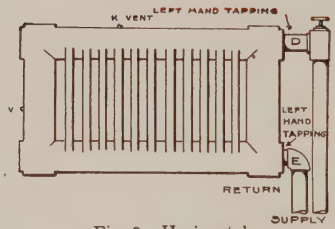


Fig. 9. Horizontal Water

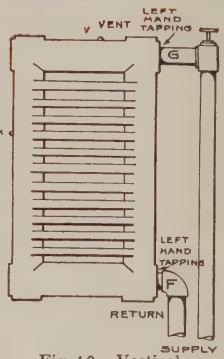


Fig. 10. Vertical Water

Fig. 11. Assembled Three Horizontal Sections in Single Tier Water

Fig. 12. Assembled Three Horizonal Sections in Single Tier One and Two-pipe Steam

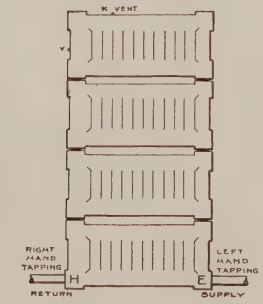


Fig. 15. Assembled Four Horizontal Sections in Four Tiers Water

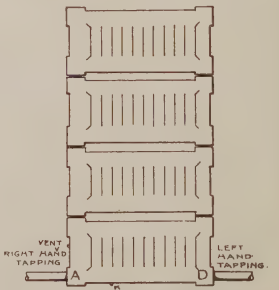


Fig. 16. Assembled Four Horizontal Sections in Four Tiers One and Two-pipe Steam

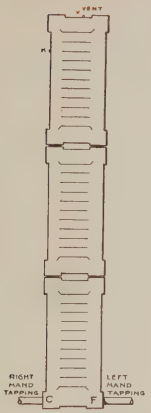


Fig. 13
Assembled Three Vertical Sections in Three Tiers
Water

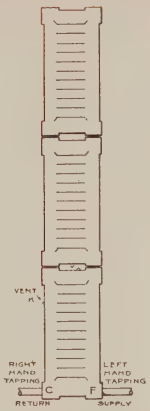


Fig. 14
Assembled Three Vertical Sections in Three Tiers
One and Two-pipe Steam

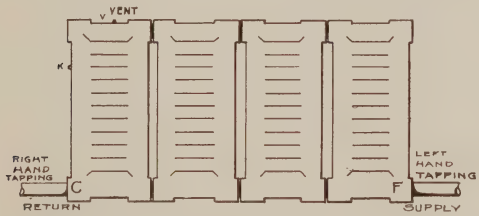


Fig. 17. Assembled Four Vertical Sections in Single Tier
Water

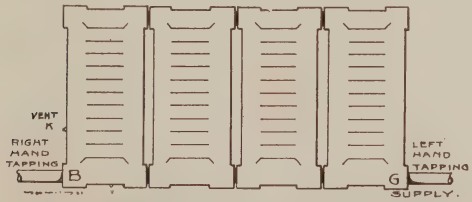


Fig. 18. Assembled Four Vertical Sections in Single Tier
One and Two-pipe Steam

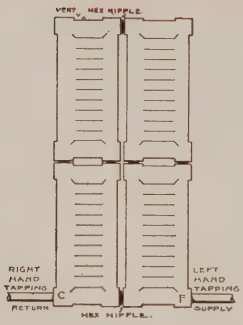


Fig. 19.
Assembled Four Vertical Sections in Two Tiers
Water

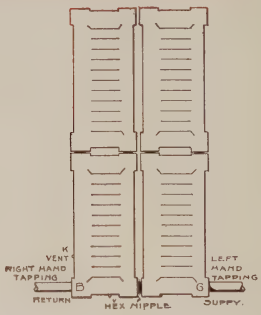


Fig. 20.
Assembled Four Vertical Sections in Two Tiers
One and Two-pipe Steam

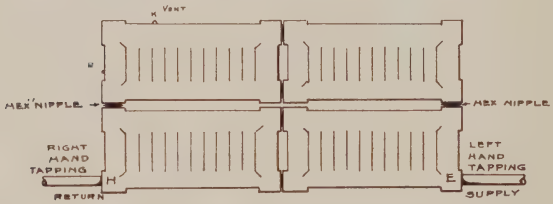


Fig. 21. Assembled Four Horizontal Sections in Two Tiers
Water

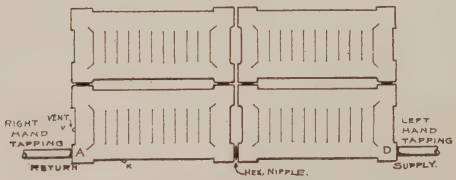


Fig. 22. Assembled Four Horizontal Sections in Two Tiers
One and Two-pipe Steam

All Colonial Wall Radiators are tapped 1½ inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 114.

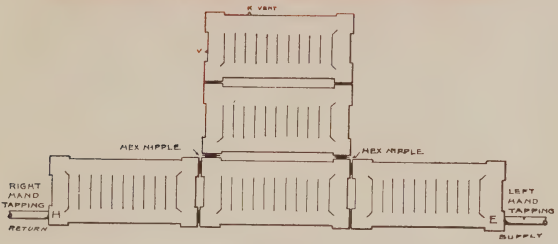


Fig. 23
Assembled Five Horizontal Sections with Three Tiers in Center
Water

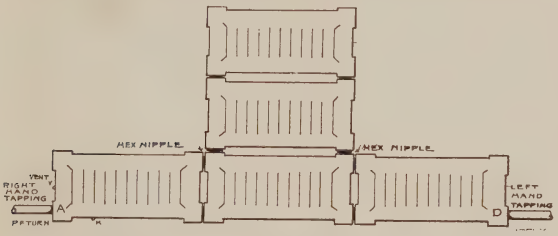


Fig. 24
Assembled Five Horizontal Sections with Three Tiers in Center
One and Two-pipe Steam

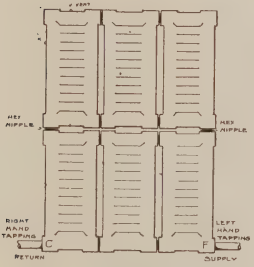


Fig. 25
Assembled Six Vertical Sections
in Two Tiers
Water

Fig. 26
Assembled Six Vertical Sections
in Two Tiers
One and Two-pipe Steam

All Colonial Wall Radiators are tapped 1½ inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 114.

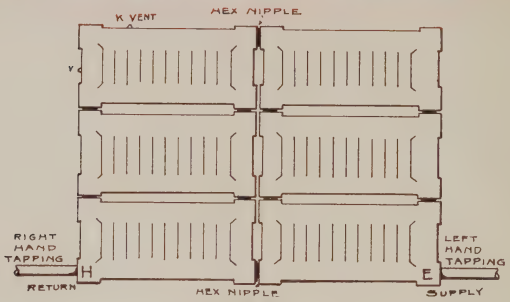


Fig. 27
Assembled Six Horizontal Sections in Three Tiers
Water

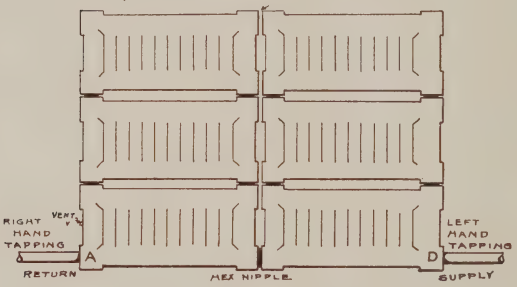


Fig. 28
Assembled Six Horizontal Sections in Three Tiers
One and Two-pipe steam

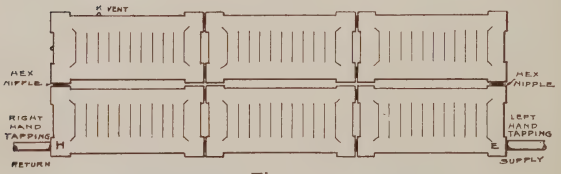


Fig. 29
Assembled Six Horizontal Sections in Two Tiers
Water

All Colonial Wall Radiators are tapped 1½ inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 114.

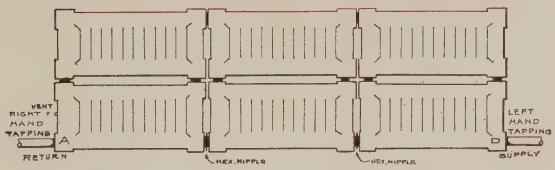


Fig. 30
Assembled Six Horizontal Sections in two Tiers
One and Two-pipe Steam

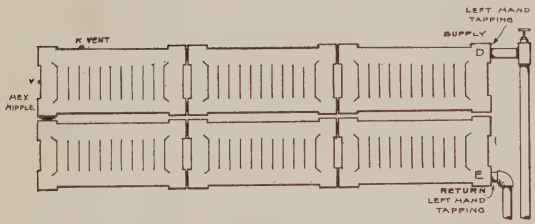


Fig. 31
Assembled Six Horizontal Sections in Two Tiers
Water

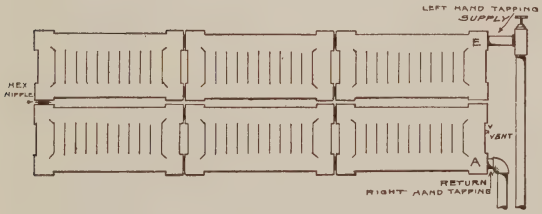


Fig. 32
Assembled Six Horizontal Sections in Two Tiers
One and Two-pipe Steam

All Colonial Wall Radiators are tapped 1½ inches supply and return, and unless otherwise ordered, will be bushed according to regular tapping list on page 114.

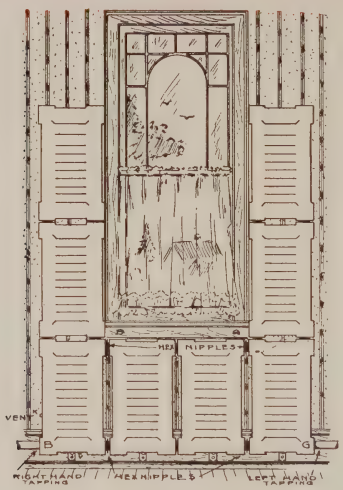


Fig. 33
Assembled Eight Vertical Sections
One and Two-pipe Steam

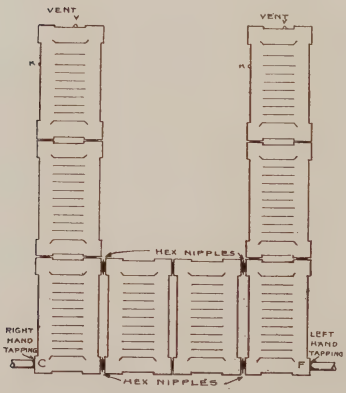


Fig. 34
Assembled Eight Vertical Sections
Water

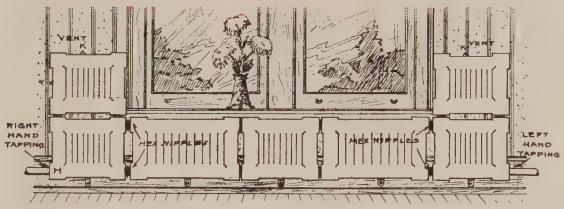


Fig. 35
Assembled Seven Horizontal Sections
Water

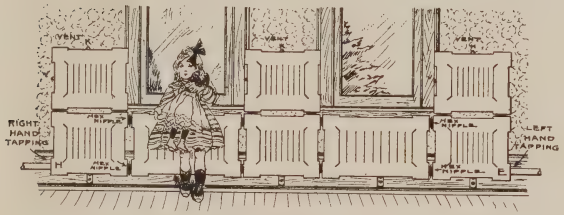


Fig. 36
Assembled Eight Horizontal Sections
Water

Fig. 37
Assembled Seven Horizontal Sections
One and Two-pipe Steam

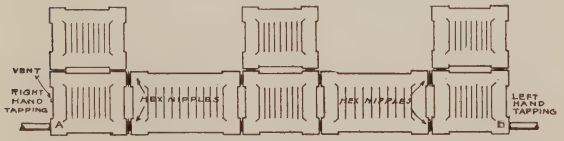
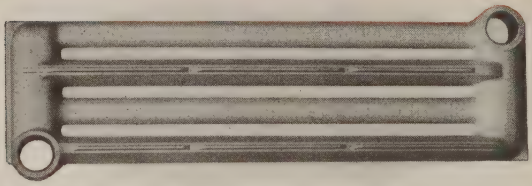


Fig. 38
Assembled Eight Horizontal Sections
One and Two-pipe Steam

Primus Water Indirect Radiators



Single Section

Each section of Primus Hot-Water Indirect Radiator contains 8 square feet of all-cored, prime heating surface.

Length of section, 38 inches. Height, 11 inches.

Width each section occupies in stack, 3½ inches.

Nipples for connecting are extra-heavy 2-inch right and left-hand threaded, with hexagon nut at the center.

Regular tapping is 2 inches, but can be bushed to any smaller size desired. Supply and return tappings are both right-hand.

Complete Stack

For convenience in handling, Indirects will be shipped loose, unless expressly ordered to be built into stacks. When ordering, customer should specify sizes of stacks into which sections will be built, so provision may be made for sending proper number of air-vent sections.

Perfection Pin Indirect Steam or Water Radiators

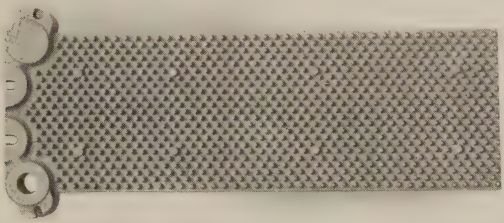
"Standard" Size, Single Section, with Bolt and Flange Connections.

Both "Standard" and "Extra Large" sizes are tapped 2 inches, and, unless otherwise ordered will be bushed according to the list shown on page 147.

All openings will have right-hand threads, unless otherwise ordered.

If location of tapping is desired other than regular, as shown by "A" in cut, we can furnish special tapping at "B," 2 inches or smaller; "C," 1¼ inches or smaller; "D," 1¼ inches or smaller. Can also furnish same special tappings at reverse end of stack if desired.

Each section of Perfection Pin Indirect "Standard" size contains 10 square feet of heating surface. Length, 36 inches. Height, 7½ inches. Height at connecting point, 11½ inches. Width each section occupies in stack, 2¾ inches; or, when specially ordered, this can be increased ½ inch, to give additional air area between sections, by furnishing sections with extra-heavy bosses.



"Extra Large" Size Section with Bolt and Flange Connection.

Each section of Perfection Pin Indirect "Extra Large" size, contains 15 square feet of heating surface. Length, 36 inches. Height, 11½ inches. Height at connecting point, 15½ inches. Width each section occupies in stack, 2⅞ inches; or, when specially ordered, this can be increased ½ inch to give additional air area between sections, by furnishing sections with extra-heavy bosses.

Perfection Pin Indirect Steam or Water Radiators

"Standard" size, single section, with right and left-hand threaded nipple connections

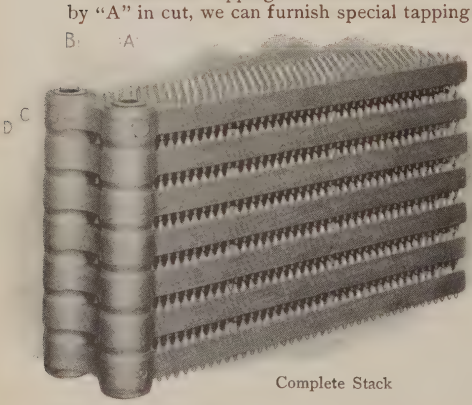
Each section of Perfection Pin Indirect "Standard" size, with right and left-hand threaded nipple connections, contains 10 square feet of heating surface. Length, 36 in. Height, 7½ in. Height at connecting point, 11½ in. Width each section occupies in stack, 2¾ in.; or, when specially ordered, this can be increased ¼ inch, to give additional air area between sections, by furnishing extra long nipples.

Each section of Perfection Pin Indirect "Extra Large" size, with right and left-hand threaded nipple connections, contains 15 square feet of heating surface. Length, 36 in. Height, 11½ in. Height at connecting point, 15½ in. Width each section occupies in stack, 2⅞ in.; or, when specially ordered, this can be increased ¼ inch to give additional air area between sections, by furnishing extra long nipples.

"Standard" and "Extra Large" sizes are tapped 2 in., and unless otherwise ordered, will be bushed in accordance with list on page 147.

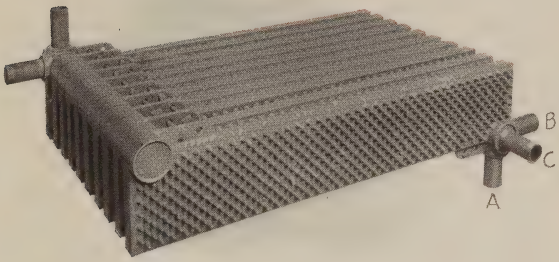
All openings will have right-hand threads, unless otherwise ordered. Connected with extra heavy 2-inch right and left-hand threaded nipples.

If location of tapping is desired other than regular, as shown by "A" in cut, we can furnish special tapping at "B," 2 inches or smaller; "C," 1¼ inches or smaller; "D," 1¼ inches or smaller. These indirects can also be furnished with same special tappings at reverse end of stack, if desired.



Complete Stack

Buffalo Standard Indirects Steam or Water Radiators



Buffalo Standard Pin

Buffalo Standard Indirects are made in two sizes: 12 square feet and 15 square feet; each section occupies 2½ inches in length of stack.

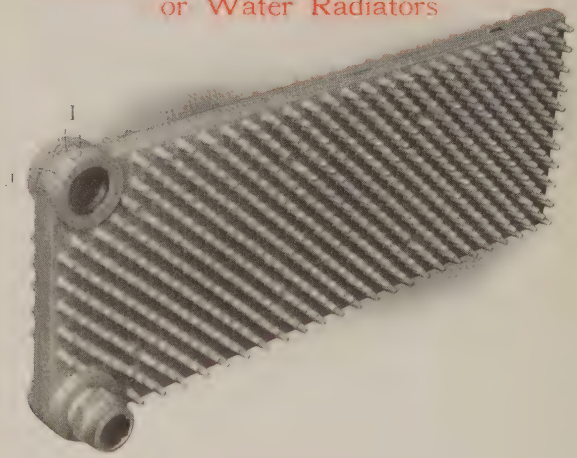
These indirects are connected by extra heavy slip nipples 2½ inches in diameter, which are slightly tapering and fit tightly into tapering sockets, thus forming "stopper" joints which are absolutely tight and perfect. The construction is further strengthened by short bolts connecting section with section.

Openings are right-hand threaded, unless otherwise specially ordered.

Indirects can be tapped for supply and return at three different points either at top, at the end, or on the face of the sections, as shown in the illustration above, but cannot be tapped at "A" or "B" larger than 1½ inches.

Unless otherwise ordered, indirects will be tapped at "A" supply and return, and in sizes according to list on page 147.

Sanitary School Pin Indirect Steam or Water Radiators



Single Section

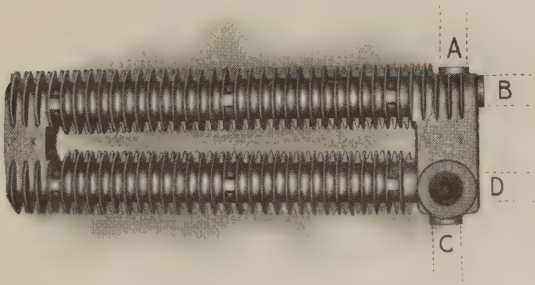
Each section of Sanitary Pin Indirect contains 20 square feet of heating surface. Length, $36\frac{3}{16}$ inches. Height, $14\frac{1}{8}$ inches. Height at connecting point, on regular pins, $15\frac{3}{16}$ inches. Height at connecting point on pins provided with special connecting hubs, as shown at "I" $16\frac{1}{4}$ inches—length of section when special connecting hub is provided, as shown at "J," $37\frac{1}{4}$ inches. Pin projects one inch from body of casting. Width each section occupies in stack, 4 inches.

These Indirects are tapped 2 inches, and unless otherwise ordered, will be bushed in accordance with list on page 147.

All openings will have right-hand threads, unless otherwise ordered.

Connected with extra-heavy 2-inch right and left hand threaded nipples, having hexagon nut at center.

If location of tapping is desired other than regular, we can furnish special tappings as shown in above illustration at "I' and "J," 2 inches or smaller.



Single Section, Showing Special Tappings.

Each section of Excelsior Junior Indirect Steam Radiator contains 8 square feet of heating surface.

Length of section, 23¾ inches. Height, 8 inches.

Width each section occupies in stack, 3⅜ inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections, 4⅜ inches.

The nipples for connecting sections are extra heavy 1½-inch, right and left-hand threaded, with hexagon nut at the center.

Regular tapping is 1½-inch; supply tapping has right-hand thread; return tapping, left-hand thread. If smaller than 1½-inch tapping be required for Excelsior Junior Steam Indirect, a 1½-inch nipple and a reducing elbow should be used, instead of a bushing, to avoid interference with diaphragm opening.

If location of tapping is desired other than regular, we can furnish special tappings as shown in above cut: "A" 1½-inch tapping or smaller; "B," 1¼-inch tapping or smaller; "C," 1¼-inch tapping or smaller; "D," 1¼-inch tapping or smaller.

Excelsior Indirect Radiators

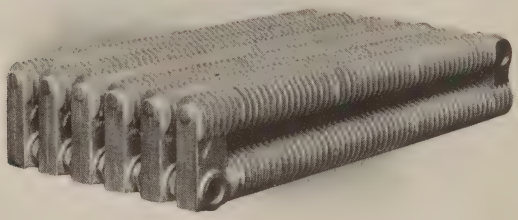
Excelsior Indirect Steam Section—Showing Special Tappings

Length of Excelsior Indirect Steam Section, 36 inches; Excelsior Indirect Hot-Water Section, 36¾ inches. Height, 8 inches.

Width occupied in stack, 3⅜ inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections, 4⅜ inches. Each section contains 12 square feet of heating surface in both Steam and Hot Water.

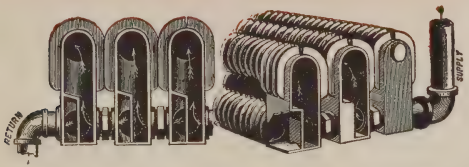
Connected with extra-heavy 1½-inch right and left-hand threaded nipples, having hexagon nut at the center.

Regular tapping is 1½-inch; supply tapping has right-hand thread, return tapping, left-hand thread. If smaller than 1½-inch tapping be required for Excelsior Steam Indirect, a 1½-inch nipple and a reducing elbow should be used, instead of a bushing, to avoid interference with diaphragm opening.



Excelsior Indirect Hot-Water Radiator—Complete Stack

If location of tapping is desired other than regular, we can furnish special tappings as shown above: "A," 1½-inch tapping or smaller; "B," 1¼-inch tapping or smaller; "C," 1¼-inch tapping or smaller; "D," 1¼-inch tapping or smaller.



End View, Excelsior Indirect Steam Radiator—Showing Circulation

The above cut shows:

First—The supply pipe attached, as it should *always be*, to the *right-hand side* of stack, and return pipe to the left-hand side.

Second—The distance the sections should be set from each other, which should be so the flanges will interlock about ⅛ inch. When specially ordered, however, sections will be connected with extra long nipples, to give additional air area between the sections.

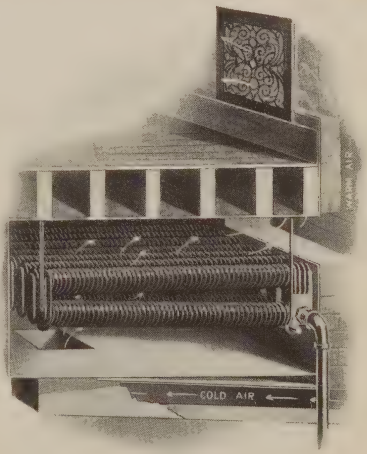
Third—The diaphragm or partition; its location and shape; which is such as to make the circulation of steam absolutely positive, and also allow the water of condensation to pass freely under it and directly to the return pipe.

Directions for Setting*

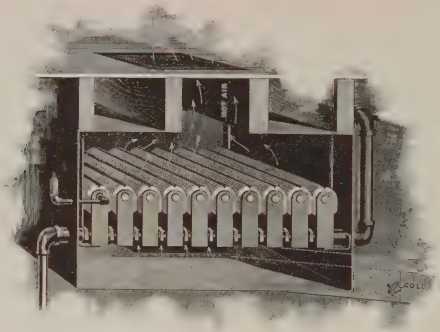
Hangers of ½-inch round iron with gimlet pointed coach screw thread on upper portions, and the lower ends so shaped as to hold iron pipe or bar iron, may be easily screwed into the joists above, and with the nearly horizontal pieces of pipe or iron, make a cheap and substantial support. The front support should be ¼-inch lower than the rear, so that the upper pipe of each Radiator will incline to the rear, and the lower pipe of each will incline to the front. By this arrangement the water of condensation will follow the course of steam throughout each section. The left-hand side of each stack should be from ½ to ¾ of an inch lower than the right-hand, so as to allow the water free passage through and out of the stack.

Each stack of Radiators should have, in the warm-air chamber, not less than 12 inches clear space above them, and not less than 6 inches below them. The *supply* and *return* pipes should always be of ample size.

This illustration shows method of introducing hot air into a room through a register in the wall.



* See, also, page 144.



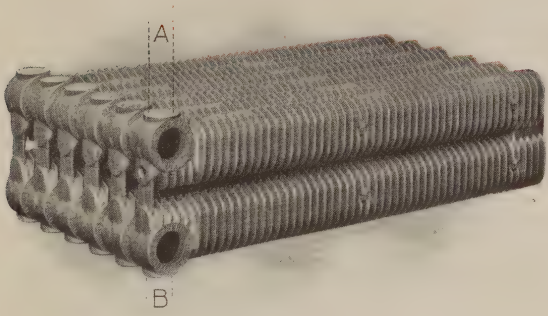
This illustration shows method of introducing hot air into a room through a register in floor.

Data for Excelsior Indirect Steam Radiators

Heating Surface Sq. ft.	Cold Air Supply Sq. in.	Diameter of Duct if Round Inches	Hot Air Flue Sq. in.	Size for Brick Work if Hot Air Flues Inches	Size of Register Inches	Ratio of 1 to 30 Cu. ft.	Ratio of 1 to 35 Cu. ft.	Ratio of 1 to 40 Cu. ft.
24	36	6.8	48	4x12	8x 8	720	840	960
36	54	8.3	72	8x12	9x12	1080	1260	1440
48	72	9.6	96	8x12	10x14	1440	1680	1920
60	90	10.0	120	12x12	12x15	1800	2100	2400
72	108	11.7	144	12x12	12x19	2160	2520	2880
84	126	12.7	168	12x16	14x22	2520	2940	3360
96	144	13.5	192	12x16	14x24	2880	3360	3840
108	162	14.4	226	12x20	16x20	3240	3780	4320
120	180	15.2	240	12x20	16x24	3600	4200	4800
132	198	15.9	264	12x24	20x20	3960	4620	5280
144	216	16.6	288	12x24	20x24	4320	5040	5760

NOTE.—For convenience in handling, Indirects will be shipped loose, unless expressly ordered to be built into stacks. Customers should, when ordering, be particular to specify the number of stacks into which sections are to be built, so that necessary vent sections may be shipped.

Cardinal Indirect Steam or Water Radiators



Complete Stack

(Patented October 4, 1887; February 26, 1895; April 2, 1895)

Each section of Cardinal Indirect contains 15 square feet of heating surface.

Length of section, 37¼ inches; height, at connecting end, 11¼ inches; at opposite end, 9¼ inches.

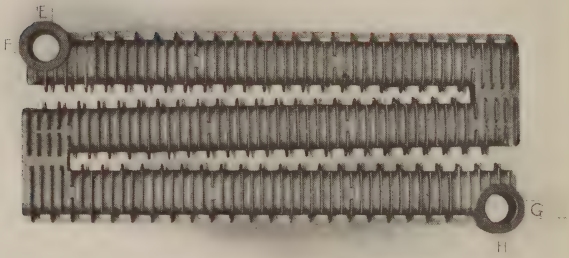
Width each section occupies in stack, 3½ inches; or, when specially ordered connected with extra long nipples, to give additional air area between sections, can be increased to 3⅞ inches or 4⅜ inches.

The nipples used for connecting sections are extra-heavy 2-inch, right and left-hand threaded, with hexagon nut at the center.

Regular tapping is 2 inches; supply tapping has right-hand thread; return tapping, left-hand thread—unless otherwise ordered.

If location of tapping is desired other than regular, we can furnish special tappings as shown in above illustration: "A," 1½-inch tapping or smaller; "B," 1½-inch tapping or smaller.

Sterling Indirect Steam or Water Radiators



Single Section

Each section of Sterling Indirect contains 20 square feet of heating surface. Length of section, 37 inches; height, 16 inches.

Width each section occupies in stack, 3½ inches; or when specially ordered, this can be increased to 4 inches, by using extra long nipples, to give additional air area between sections.

The nipples used for connecting sections are extra-heavy 2-inch, right and left-hand threaded, with hexagon nut at the center.

Unless otherwise ordered, Sterling Indirects are tapped 2 inches, and bushed in accordance with list on page 147. Both supply and return tappings are right-hand.

If location of tapping is desired other than regular, we can furnish special tappings as shown in above illustration at "E," "F," "G" or "H," 2 inches or smaller.

Tapping List of American Indirect Radiators

Steam

One-Pipe Work

Radiators containing 24 square feet and under . .	1 inch
Above 24, but not exceeding 60 feet	1¼ inch
Above 60, but not exceeding 100 feet	1½ inch
Above 100 square feet	2 inch

Two-Pipe Work

Radiators containing 48 square feet and under	1 x ¾ inch
Above 48, but not exceeding 96 feet . . .	1¼ x 1 inch
Above 96 square feet	1½ x 1¼ inch

Hot Water

Tapped for Supply and Return

Radiators containing 40 square feet and under . .	1 inch
Above 40 but not exceeding 72 square feet . . .	1¼ inch
Above 72 square feet	1½ inch

All openings will have right hand threads, unless otherwise ordered (except Excelsior and Cardinal Indirects, return tappings of which are left hand).

All Indirect air-valve tappings are regularly made ½ inch,

Measurements of American Indirect Radiators

Length of Section	Extreme Height	Name of Radiator — Indirects	Heating Surface	Width Each Section Occupies in Stack Inches †	Regular Tapping
38	11	Primus Hot Water.....	8	3½	*2
23¾	8	Excelsior Jr. Steam.....	8	3⅜	1½
36	8	Excelsior Steam.....	12	3⅜	1½
36¾	8	Excelsior Water.....	12	3⅜	1½
36	11½	Perfection Flange and Bolt Standard Size, Steam or Water.....	10	2¾	*2
36	15½	Perfection Flange and Bolt, extra large size, Steam or Water.....	15	2⅞	*2
36	11½	Perfection R. & L. Threaded, standard size, Steam or Water.....	10	2¾	*2
36	15½	Perfection R. & L. Threaded, extra large size, Steam or water..... ...	15	2⅞	*2
41¾	10¾	Buffalo, Standard, Steam or Water..	12	‡2⅝	Solid as Ordered
41¾	13¾	Buffalo, Standard, Steam or Water..	15	‡2⅝	
37¾	11¾	Cardinal, Steam or Water	15	3½	2
37	16	Sterling, Steam or Water.....	20	3½	*2
36 1/16	15 3/16	Sanitary School Pin, Steam or Water.	20	4	*2

*These radiators are all regularly tapped 2 inch and bushed according to list above.

†When greater air space is desired between sections, we can so furnish on special order.

‡End Sections of Buffalo Standard Indirects occupy three inches in stack.

Black Steel Storage Tanks

Shells, $\frac{3}{16}$ inch. Heads, $\frac{1}{4}$ inch.

Vertical and Horizontal

No.	Capacity Gallons	Diameter Inches	Length Feet	Approximate Weight	Price List
1	66	18	5	220	$48 00
2	85	20	5	250	50 00
3	100	22	5	280	52 00
4	120	24	5	380	55 00
5	145	24	6	430	58 00
6	170	24	7	490	61 00
7	180	30	5	500	64 00
8	215	30	6	560	70 00
9	250	30	7	625	75 00
10	300	30	8	690	80 00
11	325	36	6	700	92 00
12	365	36	7	790	102 00
13	420	36	8	860	112 00
14	430	42	6	900	116 00
15	575	42	8	1025	130 00
16	720	42	10	1200	146 00

Manhole in Head or Shell, $15 00, extra, List.

Handhole, $7 50, extra, List.

In ordering, state whether vertical or horizontal tanks are wanted. Unless otherwise ordered, tanks without coils, manholes or handholes will be shipped, and tappings located as per cut on page 151. All openings tapped for 2-inch pipe and reinforced.

Working pressure of above tanks are as follows: 24-inch, 80 lbs.; 30-inch, 70 lbs.; 36-inch, 60 lbs.; 42-inch, 50 lbs.; 48-inch, 40 lbs.

Coils

We can, upon special order, equip the above Horizontal Black Tanks with return bend coils, at extra charge, as per list on page 150.

Size of Coil must be determined by heating contractor, who alone is familiar with all the conditions surrounding installation.

Black Steel Extra-Heavy Storage Tanks

Shells, ¼ inch. Heads, ⅜ inch
Vertical and Horizontal

No.	Capacity Gallons	Diameter Inches	Length Feet	Approximate Weight	Price List
25	120	24	5	490	$ 60 00
26	145	24	6	560	68 00
27	170	24	7	660	72 00
28	180	30	5	660	80 00
29	215	30	6	740	90 00
30	250	30	7	840	100 00
31	300	30	8	940	110 00
32	325	36	6	940	114 00
33	365	36	7	1040	126 00
34	420	36	8	1140	138 00
35	430	42	6	1240	138 00
36	575	42	8	1500	166 00
37	720	42	10	1700	194 00
38	940	48	10	2000	232 00

Manhole in Head or Shell, $15.00, extra, List.
Handhole in shell, $7.50, extra, List.

In ordering, state whether vertical or horizontal tanks are wanted. Unless otherwise ordered, tanks without coils, manholes or handholes will be shipped, and tappings located as per cut on page 151. All openings tapped for 2-inch pipe and reinforced.

Working pressure of the above tanks is 90 lbs. for 48 in. diameter, 100 lbs. for the smaller sizes.

Coils

We can, upon special order, equip the above Horizontal Black Tanks with return bend coils, at extra charge, as per list on page 150. Size of Coil must be determined by heating contractor, who alone is familiar with all the conditions surrounding installation.

Special Note

The quality of the material used and the method of construction make these tanks first-class in every particular. Attention is called to the gauge or thickness of shells and heads employed in the manufacture both of the Storage and Extra-Heavy Storage Tanks. When these tanks are to be subjected to sudden or unusual pressure, as in the case where tanks are connected direct to City Pumping Station and the pressure is increased during times of conflagrations or the like, we can build tanks of greater gauge or thickness of metal, or it is recommended the system be equipped with Water Pressure Reducing Valve.

Price List of Coils for Storage Tanks 60 inches long

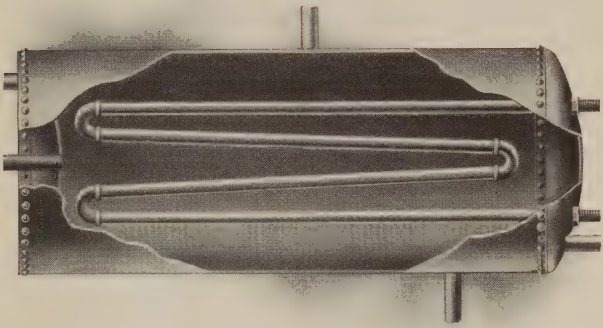
Description of Coil		18" dia.		20" dia.		22" dia.		24" dia.		30" dia.		36" dia.		42" dia.		48" dia.	
Size	Pipe	Wt.	List	Wt.	List	Wt.	List	Wt.	List	Wt.	List	Wt.	List	Wt.	List	Wt.	List
1	Black Iron	60	$11.40	62	$11.48	63	$11.52	64	$11 56	67	$11.64	70	$11.76	74	$11.94	77	$12.06
1¼		72	12.04	74	12.12	75	12.16	76	12.20	79	12.28	82	12.40	86	12.58	89	12.70
1½		85	12.74	87	12.82	88	12.86	89	12.90	92	12 98	95	13.10	99	13 28	102	13 40
2		102	14.16	104	14.24	105	14.28	106	14.32	109	14.40	112	14.52	116	14.70	119	14 82
1	Seamless Brass	62	21.20	64	21.28	65	21.32	66	21.36	69	21.44	72	21.56	76	21.74	79	21.86
1¼		76	26.60	78	26.68	79	26.72	80	26.76	83	26.84	86	26 96	90	27.14	93	27.26
1½		88	30.88	90	30.86	91	30.90	92	30.94	95	31.02	98	31.14	102	31.32	105	31.44
2		108	38.60	110	38.68	111	38.72	112	38 76	115	38.84	118	38.96	122	39.14	125	39.26

Add to or deduct from above list prices for each foot variation in length of coil

1	Black Iron	7	$ .34	7	$ .34	7	$ .34	7	$ .34	7	$ .34	7	$ .34	7	$ .34	7	$ .34
1¼		9	.44	9	.44	9	.44	9	.44	9	.44	9	.44	9	.44	9	.44
1½		12	.54	12	.54	12	.54	12	.54	12	.54	12	.54	12	.54	12	.54
2		15	.72	15	.72	15	.72	15	.72	15	.72	15	.72	15	.72	15	.72
1	Seamless Brass	8	2.64	8	2.64	8	2.64	8	2.64	8	2.64	8	2.64	8	2.64	8	2.64
1¼		10	3.60	10	3.60	10	3.60	10	3.60	10	3.60	10	3.60	10	3.60	10	3.60
1½		12	4.32	12	4.32	12	4.32	12	4.32	12	4.32	12	4.32	12	4.32	12	4.32
2		16	5.76	16	5.76	16	5.76	16	5.76	16	5.76	16	5.76	16	5.76	16	5.76

Galvanized Steel Storage Tanks

With or Without Coil



Showing Locations of Tappings, Vertical and Horizontal.

Capacity Gallons	Diameter Inches	Length Feet	Approximate Weight	Price List
66	18	5	200	$58 00
85	20	5	230	62 00
100	22	5	260	69 00
120	24	5	300	75 00
145	24	6	325	83 00
170	24	7	370	92 00
180	30	5	450	105 00
215	30	6	500	115 00
250	30	7	550	125 00
300	30	8	600	135 00

Manholes in head, extra . . . . . $30.00 each, List
Manholes in shell, extra . . . . . 35.00 "
Handholes, extra . . . . . 10.00 "

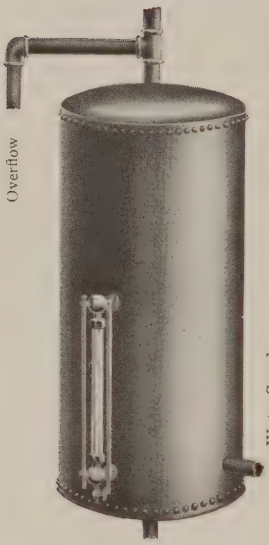
In ordering, state whether vertical or horizontal tanks are wanted. Unless otherwise ordered, location of tappings or openings will be as shown in cut above.

All openings will be tapped for 2-inch pipe.

Coils

We can, upon special order, equip Galvanized Tanks with black or galvanized pipe coils, return bend or spiral. Prices quoted on application, stating kind, size and length wanted.

Galvanized Expansion Tanks



Galvanized Steel

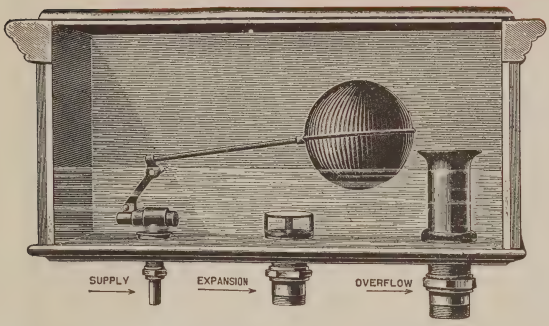
Tested at one hundred pounds pressure. Made of refined steel, riveted and calked.

TAPPING — These tanks are tapped top and bottom for one-inch overflow and expansion pipe, and on side for feed pipe.

Price List

Number	Size Inches	Capacity Gallons	Square feet of Radiation	Price of Tank	Price of Gauge
0	10x20	8	250	$ 7 50	$1 50
1	12x20	10	300	8 00	1 50
2	12x30	15	500	9 00	1 50
3	14x30	20	700	12 50	1 50
4	16x30	26	950	14 00	1 50
5	16x36	32	1300	15 00	1 75
6	16x48	42	2000	16 50	1 75
7	18x60	66	3000	31 00	1 75
8	20x60	82	5000	37 00	1 75
9	22x60	100	6000	51 00	1 75

Ideal Automatic Expansion Tanks



The Expansion tank above illustrated, aside from being ornamental, is absolutely automatic in its operation, *insuring always that the system will be full of water*, and in this respect will prove a great convenience to the house-owner. In many cases there is danger of freezing if the Tank is placed in the attic or some out-of-the-way closet. On the other hand, the customer is vigorously opposed to having the common, ungainly steel or iron Expansion Tank placed in the bathroom or in a living room, where it is unsightly and objectionable. The Tank is made of hardwood, dovetailed corners, having a tight cover, and lined with sheet copper. It can be supplied in any finish of wood, to harmonize with the finish of room in which it is installed. It does not require altitude gauge, nor gauge glass and fittings. The price asked makes it easily available without increasing expense of the job. Inside measurements of Tank are: 20 inches long, 9 inches wide, 10 inches deep; and of ample capacity for use on any job of hot-water work to which there is attached 3000 feet of radiation or less.

Price List for Tanks.

Including expansion and overflow couplings, with iron pipe thread.

No.		Price, each
252	Beaded, varnished, plain oak . . .	$8 50
262	Rounded corners, varnished, plain oak	9 00

Upon special order, we can furnish these Tanks in genuine cherry, walnut or quarter-sawed oak, at $1.25 each extra, net.

Order by Number

Plastic Asbestos Cement

Per bag of 100 pounds, $4.00 Per bag of 50 pounds, $2.15

The following is a list of the amount of Plastic Asbestos Cement required to cover 1¼ inch thick the various sizes of IDEAL Boilers.

Sectional Steam and Water

No. of Boiler	Pounds
502 or 512	125
602 or 612	150
702 or 712	175
084 or 184	125
085 or 185	150
086 or 186	175
087 or 187	200
21–5	200
21–6	250
21–7	300
045 or 245	200
046 or 246	250
047 or 247	300
048 or 248	350
30–5	550
30–6	625
30–7	700
30–8	775
065 or 365	575
066 or 366	650
067 or 367	725
068 or 368	800
069 or 369	875

Portable Water

13	125
14	150
15	175
24	175
25	200
26	225
34	200
35	225
36	250
37	275
44	250
45	275
46	300
47	325
55	275
56	325
57	375
58	425

Premier Steam and Water

No. of Boiler	Pounds
015 or 152	150
018 or 182	175
019 or 183	200
020 or 211	175
021 or 212	200
022 or 213	225
024 or 241	225
025 or 242	250
026 or 243	275
027 or 281	250
028 or 282	275
029 or 283	300
031 or 321	300
032 or 322	350
033 or 323	400

Invincible Water

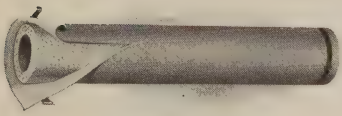
120	100
130	125
230	125
240	150
330	200
340	250
430	300
440	350
450	400
530	350
540	400
550	450

Invincible Steam

113	150
114	175
223	175
224	200
225	225
333	225
334	250
335	300
443	300
444	350
445	400
554	400
555	450
556	500

Asbestos Magnesia Molded Covering

For Low and High Pressure Steam Pipes



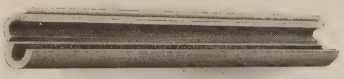
Composed of Asbestos, Magnesia and other fire-proof, non-conducting materials, all of a superior quality. The Asbestos used is of unusually long fiber, which also serves as a thorough binder, and with the outer shell or wrapper of canvas, makes a very durable, as well as an excellent non-conductor. Is made in sections three feet long. Sections are cut lengthwise through the center, and price includes brass-lacquered bands to hold in position on the piping

Price List

Inside Diameter of Pipe Inches	Price per Lineal Foot	Regular and 45° Ells	Tees, Each	Valves, Each	Inside Diameter of Pipe Inches	Price Per Lineal Foot	Regular and 45° Ells	Tees, Each	Valves, Each
½	$0 22	$0 24	$0 36	$0 36	3	$0 45	$0 44	$0 57	$0 57
¾	24	30	39	39	3½	51	48	63	63
1	27	30	39	39	4	57	52	70	70
1¼	30	30	39	39	4½	63	60	78	78
1½	33	30	39	39	5	69	69	90	90
2	36	33	44	44	6	75	78	1 08	1 08
2½	41	38	49	49	7	82	99	1 44	1 44

Wool-Felt Covering

½-inch Thick—For Hot-Water Pipes



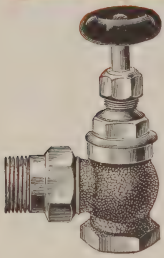
Composed of successive layers of soft wool-felt lined with asbestos sheathing and furnished with canvas jacket and brass-lacquered bands. Supplied in sections three feet long cut lengthwise through the center. Covering can, when specially ordered, be furnished in ¾ or 1-inch thickness.

Price List

Inside Diameter of Pipe, inches	Price per Lineal Foot	Inside Diameter of Pipe, inches	Price per Lineal Foot
½	$0 22	3	$0 45
¾	24	3½	51
1	27	4	57
1¼	30	4½	63
1½	33	5	69
2	36	6	75
2½	41	7	82

We do not make ells, tees, etc., for Wool-Felt Covering, but instead supply these fittings in the Molded Asbestos as listed above.

Quick-Opening Steam Radiator Valves



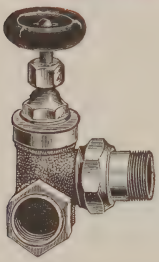
WITH UNION
Threads—Right-Hand on Union
Right-Hand on Bottom

These Valves are to some extent used on Hot Water work, and where so employed we can furnish with $\frac{1}{16}$-inch hole bored through the disc.

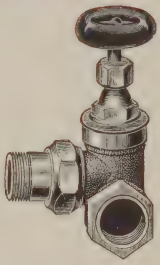
Price List for Valve, with Union, and Jenkins Disc.

No.	Size, inches	¾	1	1¼	1½	2
10	Rough body, finished trimmings	$3 50	$4 30	$5 85	$7 75	$12 60
11	Rough body, plated trimmings	3 75	4 65	6 25	8 00	12 85
*12	Rough body, plated all over	3 80	4 75	6 40	8 10	13 10
14	Finished body, plated all over	4 25	5 25	7 00	9 25	14 35
	Jenkins Discs, extra	25	30	45	60	90

Screw-Stem Steam Corner Valves



Right-Hand Valve
Threaded—Right-Hand on Union
Right-Hand on Bottom



Left-Hand Valve
Threaded—Right-Hand on Union
Right-Hand on Bottom

Price List for Valve, with Union and Jenkins Disc

No.	Size, inches	¾	1	1¼	1½	2
30	Rough body, finished trimmings	$3 85	$4 75	$6 45	$8 55	$13 85
31	Rough body, plated trimmings	4 15	5 15	6 90	8 80	14 15
*32	Rough body, plated all over	4 20	5 25	7 05	8 95	14 45
34	Finished body, plated all over	4 85	6 00	7 80	9 95	15 95
	Jenkins Discs, extra	25	30	45	60	90

All Valves Threaded as described, unless otherwise ordered.
*This Finish regularly carried in stock; other finishes can be promptly shipped from factory.

Screw-Stem Steam Radiator Valves

With Union
Threads—Right Hand on Union.
Right Hand on Bottom.

Without Union
Threads—Right on Side
Right on Bottom.

Price List for Valve, with Union, Brass Disc

No.	Size, inches	¾	1	1¼	1½	2
60	Rough body, finished trimmings	$2 45	$3 25	$4 50	$6 50	$10 00
61	Rough body, plated trimmings	2 60	3 35	4 90	6 65	10 25
*62	Rough body, plated all over	2 85	3 65	5 05	7 10	10 85
64	Finished body, plated all over	3 40	4 30	5 80	8 10	12 35

With Jenkins Disc

70	Rough body, finished trimmings	$3 50	$4 30	$5 85	$7 75	$12 60
71	Rough body, plated trimmings	3 75	4 65	6 25	8 00	12 85
*72	Rough body, plated all over	3 80	4 75	6 40	8 10	13 10
74	Finished body, plated all over	4 25	5 25	7 00	9 25	14 35
	Jenkins Discs, extra	25	30	45	60	90

Price List for Valve, without Union, Brass Disc

No.	Size, inches	¾	1	1¼	1½	2
80	Rough body, finished trimmings	$1 60	$2 25	$3 25	$4 50	$ 7 00
81	Rough body, plated trimmings	1 85	2 40	3 60	4 85	7 25
82	Rough body, plated all over	1 95	2 65	3 70	5 00	7 75
84	Finished body, plated all over	2 50	3 25	4 45	6 00	9 25

With Jenkins Disc

90	Rough body, finished trimmings	$2 50	$3 20	$4 50	$6 25	$10 50
91	Rough body, plated trimmings	2 70	3 50	4 75	6 50	10 75
92	Rough body, plated all over	2 85	3 65	4 90	6 75	11 00
94	Finished body, plated all over	3 10	4 00	5 40	7 75	12 25
	Jenkins Discs, extra	25	30	45	60	90

All Valves threaded as described, unless otherwise ordered.
*This finish regularly carried in stock. Other finishes can be promptly shipped from factory.

Q. O. Bonnetless Water Radiator Valves

With Union.
Threads—Right-Hand on Union.
Right Hand on Bottom.

Without Union.
Threads—Right on Side.
Right on Bottom.

These Valves are made without bonnet, body being made in one piece, thus dispensing with one screwed joint and making the Valve correspondingly more tight and durable. The water way is full and free. It is unequaled.

NOTE—We continue to supply the old-style Bonneted Quick-Opening Hot-Water Valves where customers prefer them, the list prices thereon being the same as given below for the Bonnetless Valves.

Price List, with Union.

No.	Size, inches	¾	1	1¼	1½	2
99	Rough body, finished trimmings	$2 45	$3 25	$4 50	$6 50	$10 00
100	Rough body, plated trimmings	2 60	3 35	4 90	6 65	10 25
*101	Rough body, plated all over	2 85	3 65	5 05	7 10	10 85
103	Finished body, plated all over	3 40	4 30	5 80	8 10	12 35

Price List, without Union.

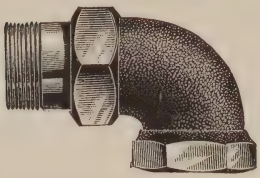
No.	Size, inches	¾	1	1¼	1½	2
109	Rough body, finished trimmings	$1 60	$2 25	$3 25	$4 50	$7 00
110	Rough body, plated trimmings	1 85	2 40	3 60	4 85	7 25
111	Rough body, plated all over	1 95	2 65	3 70	5 00	7 75
113	Finished body, plated all over	2 50	3 25	4 45	6 00	9 25

All Valves threaded as described, unless otherwise specified.

* This finish regularly carried in stock. Other finishes can be promptly shipped from factory.

Union Elbows

For Union Radiator Valves



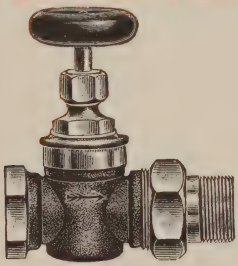
Both Threads Right Hand

Price List

No.	Size, inches	¾	1	1¼	1½	2
130	Rough body, plain.	$1 75	$2 25	$2 95	$3 70	$6 00
131	Rough body, plated trimmings	1 90	2 40	3 10	3 85	6 15
*132	Rough body, plated all over .	2 00	2 50	3 20	4 00	7 00
134	Finished and plated all over .	2 40	3 00	3 90	4 85	8 50

All Ells threaded as above described, unless otherwise ordered.

Straightway Q.-O. Water Radiator Valves



Threads—Right-hand Both Openings

This valve can be fully opened or closed by one-quarter turn of handle. It must be connected so that the current of water will move in the direction indicated by the arrow on its side.

Price List, with Union

No.	Size, inches	¾	1	1¼	1½	2
114	Rough body, finished trim'gs	$2 45	$3 25	$4 50	$6 50	$10 00
115	Rough body, plated trimmings	2 60	3 35	4 90	6 65	10 25
*116	Rough body, plated all over .	2 85	3 65	5 05	7 10	10 85
118	Finished body, plated all over	3 40	4 30	5 80	8 10	12 35

All Valves Threaded as described, unless otherwise ordered.

* This Finish regularly carried in stock; other finishes can be promptly shipped from factory.

No. 178 Screw-Stem Brass Globe Valves

Extra Heavy, for Steam, Water, Oil or Gas

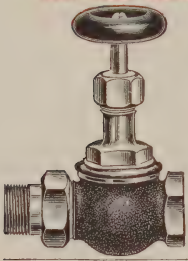
A joint in the cap permits the repacking of stem without leakage.

These Valves are much heavier and much more thoroughly finished than the Ordinary Globe Valves.

Price List for Valve, with Jenkins Disc, Iron Wheel. Rough Body—Plain

Size, Inches	Price	Size, Inches	Price
⅛	$1 10	1	$2 80
¼	1 10	1¼	4 00
⅜	1 25	1½	5 50
½	1 60	2	8 00
¾	2 20		

No. 189 Screw-Stem Brass Globe Valves

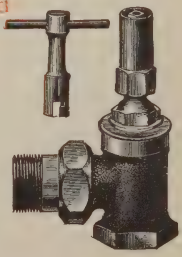


Price List, with Union, Jenkins Disc, Wood Wheel

Threads—Right-Hand, Both openings. Rough Body—Plated all over

Size, Inches	Price
¾	$ 3 80
1	4 75
1¼	6 40
1½	8 10
2	13 10

Lock and Shield



All styles of Radiator Valves can be furnished, on special order only, with Lock and Shield. No extra charge.

Keys, extra, plain, each . . . $0 15
Keys, extra, plated, each . . 20

Note—When ordering specify number and size of Valve, adding the words "Lock and Shield."

No. 335 I. W. Brass Gate Valves

Double Gate, Screwed, without Union

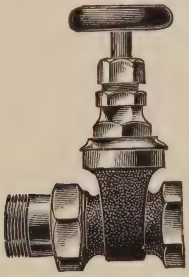
Price List. Rough body, plain

Size, in. . .	½	¾	1	1¼	1½	2	2½
Price, ea.	$1 30	$1 75	$2 50	$3 50	$5 00	$7 50	$14 00

These valves open to the left and have rising stems.

No. 373 W. W. Brass Gate Valves

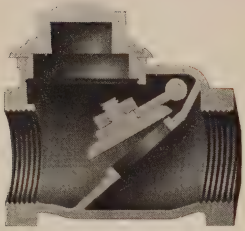
Double Gate, Screwed, with Union



Price List. Rough body, plated all over

Size, inches	½	¾	1	1¼	1½	2
Price, each	$3 10	$3 75	$4 65	$6 10	$7 85	$12 10

No. 741 Brass Check Valves



The seat of this check is set at an angle of 45 degrees to the center, and the disc being hung on a hinge will therefore close of its own weight. The disc and valve seat are regrinding; by unscrewing the cap you can rotate the disc with a screw-driver or piece of flat iron without disconnecting from pipes. This can be used as a vertical or horizontal check valve. Furnished with flanges when specially ordered.

Price List

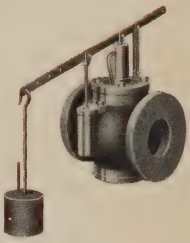
Size, inches . . .	½	¾	1	1¼	1½	2	2½	3
Brass valves, scr'd	$1 50	$1 75	$2 25	$3 25	$4 25	$6 25	$12 00	$20 00

Ideal Pressure-Regulating Valves

Simple, sensitive and reliable. Made for all pressures. No packing, stuffing boxes or rubber. When ordering, give boiler pressure, and state to what pressure it is desired to reduce with valve.

Specify as far as possible what duty the reduced steam is to be used for. If for use on Vacuum System, specify name of System.

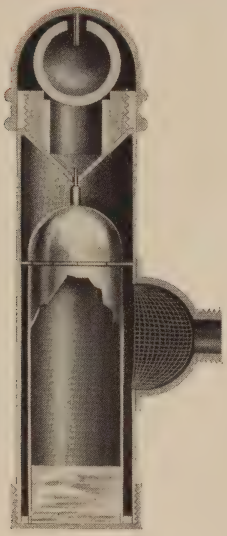
If flanged fittings are wanted, specify whether to be counter flanges or else send templet if valve is to be drilled.



No. 2 with Dash Pot

Size, in.	Price, each	Size, in.	Price, each	Size, in.	Price, each
1	$23 00	3	$42 50	6	$100 00
1¼	24 00	3½	52 50	7	125 00
1½	25 00	4	60 00	8	185 00
2	30 00	4½	70 00	10	275 00
2½	35 00	5	75 00	12	350 00

Morgan Improved Vacuum Valves



In proportion as the heating job is fairly tight, these valves will hold the heat in the radiators for hours after the fire in the boiler is insufficient to generate steam. In this respect, the valves are fuel savers and more than repay their cost in a single heating season.

This valve in its new form has been greatly improved, particularly in the placing of the collapsible ball at the top of the valve, instead of in the lower part of the valve, as formerly. This not only greatly prolongs the life of the ball, but also enables a ready means of renewing the ball without taking the valve apart.

As shown by cut, there are no screws or adjusting cap, so that no opportunity is offered irresponsible persons to meddle with the adjustment. The valve requires no adjustment and cannot be injured. It is perfectly noiseless in operation. So sensitive is the valve in its operation that the air is removed even to the last atom and the true heat of the steam attained in the radiators.

List Price, each, $1 50

Libra Automatic Air Valves

For Venting Steam Radiators

A radical departure; entirely new in principle; needs no adjusting; made entirely of brass: perfectly noiseless in operation; does not sputter water.

Expansion Performed Solely by Air, Heat and Water.
Illustrations Show Exact Size of Valve.

Fig. A—Valve Open.

That portion of the valve below its nipple connection to the radiator forms a well, for retaining the water of condensation. The proportions of this well and the proportions and weight of the float are such as to give exactly the desired buoyancy to the float.

The lower end of the float is sealed by the water of condensation. The heat expands the air in the float (see Fig. B), causing the float to rise to its seat, and closing the valve. As pressure increases, the water in the well is driven into the float, compressing the air held above the water in the float, thus keeping the float to the seat and the valve closed.

When the heat subsides, the air in the float contracts, drawing the water into the float (see Fig. A), which, adding its weight to the float, causes the float to leave its seat and the valve to open.

When heat is again applied, the air in the float is expanded (see Fig. B), driving the water from the float, and at the same instant the float is raised and the valve is again closed. The water driven from the float displaces the water in the well and forces the surplus back into the radiator.

Any air displaced from the float during the operation is immediately replaced by gravity, as soon as the water in the float reaches the level of the bottom of the float. This action or principle guarantees that an equilibrium will constantly be maintained; and this constant effort to reach

and maintain an equilibrium, together with the expansion of the air when under heat, insures always the operation of the valve in the highest sensitive degree.

It will, therefore, be observed that the operation of the valve is secured solely by the use of the elements contained in the heating system, viz., air, heat and water. So extremely sensitive is the action of the valve that the air, even to the last atom, is removed from the system.

Fig. B—Valve Closed

Perfectly noiseless is the operation, and water is not sputtered from the vent, as is commonly the case with air valves. The enlargement or swell between the nipple connection to radiator and the body of the valve is to avoid capillary attraction, thus making unnecessary the use of a siphon or double passages through nipple as in the case of other forms of valves.

The pin at the top of the float is of tempered German silver and made tapered, so that a tight seat is always secured.

It will be observed that there are no caps, screws or other devices, as in other forms of valves, and which give so much trouble because of affording opportunity for irresponsible people to meddle with the adjustment. The "Libra" valve needs no adjustment, and has no adjusting features, hence it cannot be injured. It cannot possibly get out of order, as it is made entirely of brass—air, water and heat alone being employed as the expanding agents.

List price, each, $1.00.

Imperial Automatic Air Valves

They are the best constructed valves on the market in which a sensitive material is used for expansion. The expansion cylinder is far more sensitive and far more durable than the solid expansion posts ordinarily used.

Valve has a baffle plate, which prevents the float from being blown up by sudden pressure. The bottom-piece or well is extra deep, forming a water balance which acts as a siphon in keeping valve free from condensation.

List price, each, $1 15.

Imperial Lock Shield Automatic Air Valves

Where it is desired, our regular Imperial Valve can be equipped with lock and shield device at top, as shown in cut, by the mere addition of open cap and lock shield adjusting screw. Our Imperial Valves all have adjustable repacking glands, and will always remain tight. This valve has a special key without which no one can change the adjustment, and accidental flooding of floors and damage to ceilings is prevented. Every valve is guaranteed.

List price, $1 35 each.

Russell Automatic Air Valves

For Steam and Water

Principle of construction is such that all the air is expelled from the radiator or coil, without loss of steam or water. The float contains a liquid extremely sensitive to heat, which vaporizes at 151 degrees Fahrenheit, expanding the corrugated heads, and closing the valve against loss of steam. All parts cast solid and finished on a lathe, which insures free waterways for steam and water. Guaranteed in every respect. Price, $1 15 each.

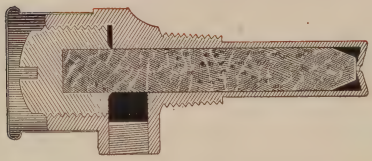
Imperial Straight Shank Automatic Air Valves

This valve is constructed for coils and indirect radiation. The opening in the base which delivers steam is higher than the opening through which condensation returns, thereby insuring perfect circulation within the valve, and will not become water-logged. Threaded for ⅛-inch pipe only.

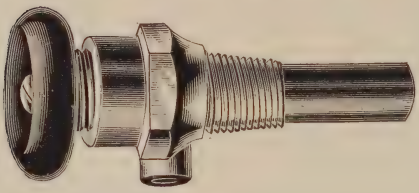
When desired, can also furnish the Russell Automatic Straight Shank Valves with ¼-inch threading.

Price, $1 15 each.

Victor Automatic Air Valves



No. 1 (Cross Section View) with Cap

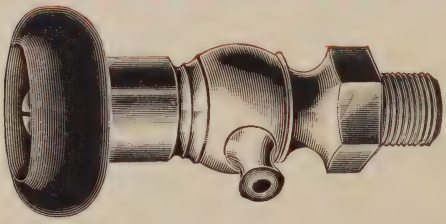


No. 2 with Wood Wheel
For Use on Dry or Vapor Steam Work

List price, either style, $7 50 per dozen.

On wet steam work, Evaporating Cup should be used, which we furnish at an additional price of ten cents each net.

Russell Spring Self-Closing Air Valves



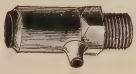
No escape of water or steam. Valve cannot be left open. It is an excellent article for flats, hospitals and public buildings, and it removes all danger of damage from water or steam, as the valve *cannot be left open* by thoughtless persons. Will remain tightly closed against 70 pounds pressure. Every valve guaranteed. Threaded for iron pipe, size ⅛-inch.

Price, $3 00 per dozen.

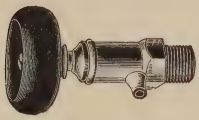
Compression Air Valves

Old Style, Key, No. 4

Old Style, Wood Wheel, No. 3



Improved, Key, No. 4

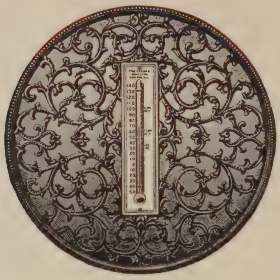


Improved, Wood Wheel, No. 3

Nickel Plated

Threaded for Iron Pipe, size ⅛ in.; price, each	$0 70
Keys, extra, each	05

Powers Temperature Regulators



Reliable and effective Temperature Regulators, for house-heating boilers. Simple in construction. Absolutely *Automatic.*

Will add materially to the efficiency of any heating plant. Prevents heater boiling over, and maintains uniform temperature in the house.

Price List

No. 2 REGULATOR, may be used on hot-water boiler to control room temperature only, will not prevent heater from boiling $40 00

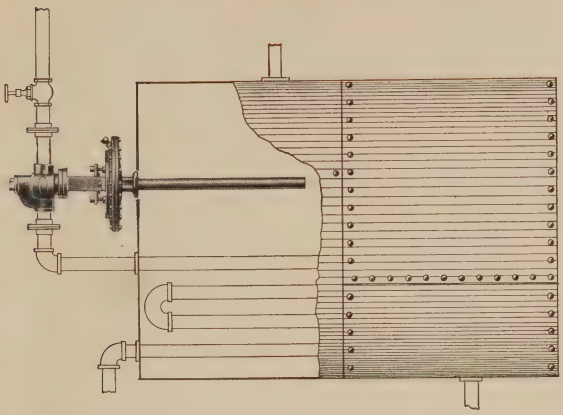
No. 3 REGULATOR COMPLETE for low-pressure steam heater $45 00

No. 4 REGULATOR COMPLETE for hot-water boiler, controls room temperature, and absolutely prevents system from boiling over; with this regulator a water temperature of 212° may be carried in extreme weather $50 00

Check dampers (special construction) for smoke pipe should always be used. Each, net . . $1 25

Send for complete catalogue of Regulators.

Powers Hot-Water Tank Regulator
No. 8



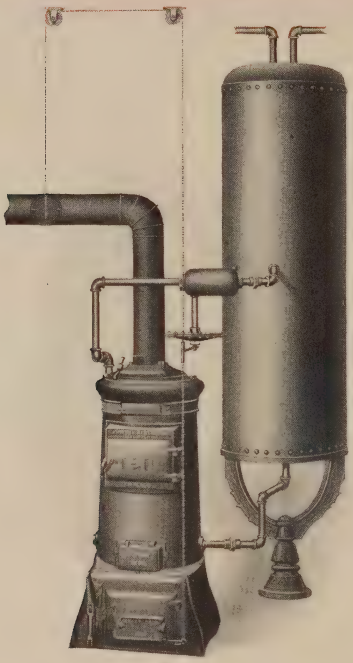
This regulator is used where the tank is heated by steam through a pipe not larger than two inches. Pipe of this size or smaller can be readily connected with the valve as shown in above cut; and a great advantage in this No. 8 Regulator lies in the fact that it is self contained, and when put in place is ready to operate without further adjustment.

This regulator is made to operate at a certain definite temperature (180 degrees unless otherwise specified). In use it will close its steam valve when the water in tank reaches the desired temperature, opening again when water is drawn and the temperature lowered, and thus positively controls the supply of steam and prevents over-heating.

No. 8 Tank Regulator

Size, 1 inch	List price, each,	$70 00
" 1¼ "	" " "	75 00
" 1½ "	" " "	80 00
" 2 "	" " "	90 00

Powers Tank Regulator No. 1



No. 1 Powers Regulator in Position.

Here is shown the coal burning IDEAL Tank Heater equipped with the No. 1 Regulator.

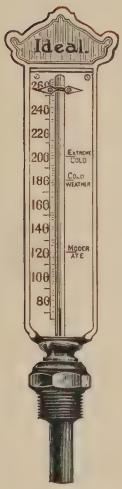
The regulator is placed in the flow pipe between Heater and tank. By operating the draft dampers, it checks the fire automatically when the circulating water approaches an excessive temperature, and thus effectually prevents overboiling.

This regulator is also applied to IDEAL Tank Heaters burning natural gas. The application is similar to that shown above except that instead of the regulator being attached to the dampers, it is connected to a *special gas valve* and closes and opens this valve as the water temperature rises or falls from the desired point.

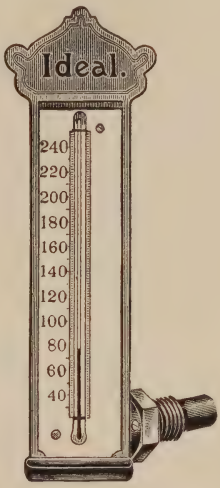
No. 1 Tank Regulator is made in one size only, tapped 2-inch. List price, $25.00 each.

Ideal Hot Water Thermometers

Separable Mercury Bath



Straight



Angle

The glass bulb of each instrument is immersed in a Mercury bath, protected by a thin steel tube, so there is little chance of injury.

Stem should be fully immersed in, or subject to a continuous circulation of the hot water, to secure accurate reading.

If thermometer does not face in right direction when screwed up tight, loosen small screw slightly and (without lifting) turn top of frame to desired position, after which tighten small screw.

Each thermometer is carefully packed in a separate wooden box.

	List Price Each
Hot Water Thermometer, straight	$5 00
Hot Water Thermometer, angle (*for use on risers, or circulating pipe*)	6 00

Ideal Steam Gauges, Bourdon Spring

Size 4½ inches, iron case, without back flange; nickel plated rim; silvered dial; without cock. Registering 30 lbs. pressure.

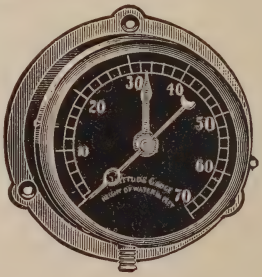
In all respects as regularly supplied on IDEAL Steam Boilers.

These gauges are all equipped with hair-spring tension, so the movement is rendered very sensitive at the lowest pressures under which house-heating boilers are usually operated —viz., 2 lbs. or less. We can also supply high-pressure gauges (prices on application).

Price $8 00 each.

Ideal Altitude Gauges

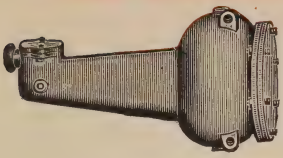
These gauges will indicate accurately, at the boiler, the height of water in the system, and will be found very useful instruments.



EXPLANATION: When the water is at its proper level in expansion tank, remove the ring and glass, and set the stationary hand at the pressure indicated by the working hand: whenever the pressure falls below this point, water should be added.

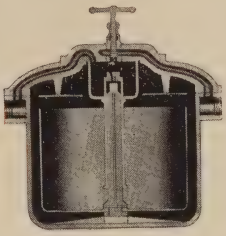
Size: 5 inches; iron case, with brass rim; without cock; $8 00 each

Ideal Automatic Boiler Feeders



Outside Length.....24 inches
Height..... ....12 "
Width..... 9 "
Size of Boiler Connection..... 1 inch
Size of GaugeGlass Connection..... ½ "
Size of Feed Water Inlet ¾ "
Price, $15.00

Nason's Patent Steam Traps

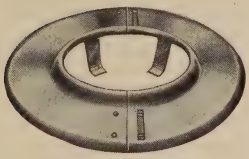


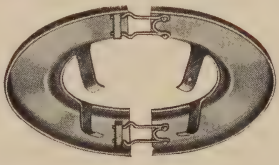
When pressures exceeding 80 pounds are to be used, or if the pressure is always less than 30 pounds, especial note should be made of this fact, in order that the traps may be fitted with valves of smaller or larger area than is common, and otherwise adjusted to their particular work.

Number.....	1	2	3	4	5
Size of pipe connection, in	½	¾	1	1¼	1½
Diam., outside of flanges, in	10¾	14¼	15¾	19	24¼
" of cylinder, inches. .	8	10½	12	14	18
Height to top of valve, inches	11	14	16¼	18½	23½
" " cover, inches	8	10	12	14	15½
Maximum discharge, pounds per minute.....	2	5	8	12	20
Greatest number of square feet of surface to which it should be applied.....	350	900	1400	2000	3500
Greatest number of lineal feet of 1-in. pipe surface to which it should be applied.	1050	2700	4200	6000	10500
Price, each.....	$16.00	$20.00	$27 50	$42.50	$70.00

Imperial Floor and Ceiling Plates

Adjustable, made of spring brass and nickel plated.



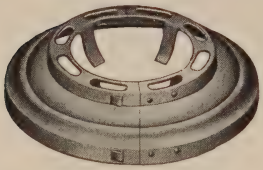


Easily adjusted to the pipe and will stay firmly in position. Will always hold the nickel.

Size, inches.....	½	¾	1	1¼	1½	2	2½	3
Nickel, each.....	$0.25	$0.25	$0.28	$0.32	$0.35	$0.38	$0.52	$0.75

Russell Floor and Ceiling Plates

Adjustable, made of Spring Brass and Nickel Plated

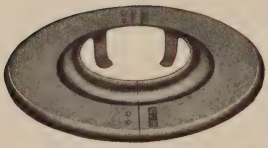


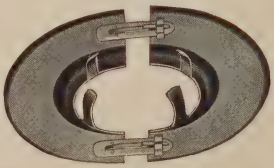
Easily adjusted to the pipe and will stay firmly in position. The holding springs are now perforated for wire, where it is preferred to wire to the ceiling, although the plate will remain firmly on the pipe in any event. Will always hold the nickel. Finished in any color, no extra charge. Any part of plate can be used by cutting to fit with tinner's shears. Send for sample.

Size, inches	½	¾	1	1¼	1½	2	2½	3
Nickel, each	$0 25	$0 25	$0 28	$0 32	$0 35	$0 38	$0 52	$0 75

Ajax Cold-Rolled Steel Plates

Adjustable, for Floor and Ceiling



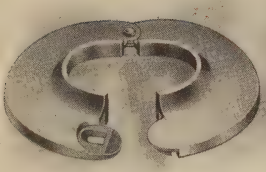


Patented

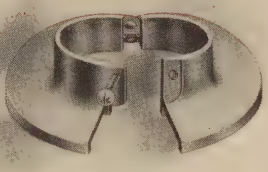
These plates have a bright, planished finish, resembling nickel plate, but are intended to take the place of black iron plates. Are very strong, may be easily adjusted to the pipe, and will stay firmly in position. Send for sample.

Size, inches	½	¾	1	1¼	1½	2
Black, each	$0 12	$0 12	$0 15	$0 18	$0 20	$0 24

B. and C. Floor and Ceiling Plates



Floor Plate



Ceiling Plate

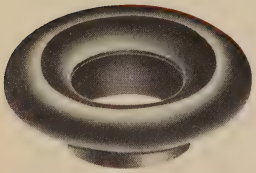
These Adjustable Hinged Plates can be put on after work is finished by slipping Plate around pipe, the Ceiling Plate being fastened to pipe by means of screw, and the Floor Plate firmly held by a simple, cleverly contrived spring. Send for sample.

Price List

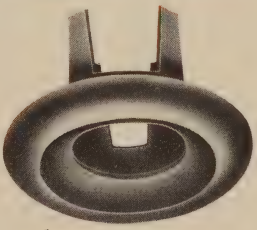
Size, inches . .	½	¾	1	1¼	1½	2	2½	3
Black, each . .	$0 14	$0 14	$0 18	$0 20	$0 24	$0 28	$0 43	$0 60
Nickel, each . .	25	25	28	32	35	38	52	75

Worcester Brass Floor and Ceiling Plates

Solid. Nickel Plated



Floor Plate



Ceiling Plate

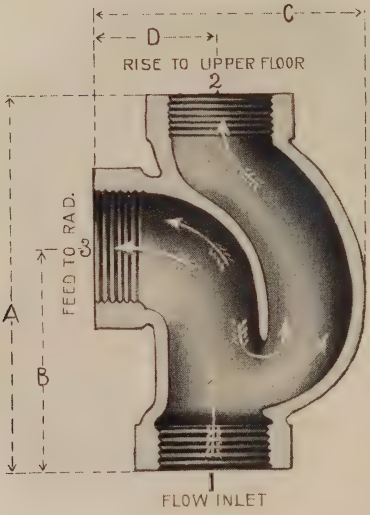
Price List

Size, inches . . .	½	¾	1	1¼	1½	2
Each	$0 09	$0 10	$0 11	$0 12	$0 13	$0 15

O. S. Distributers

Proportioned and Constructed on Practical and Scientific Principles

Insure Free, Positive, Uniform Circulation



Their use saves labor, fittings and joints; also the unnecessary cutting of floors and beams. All joints exposed above the floor if desired.

For measurements and list prices, see page 180.

NOTE—Attention is invited to the Straightway Quick-opening Hot Water Valves shown on page 159, which can be used to splendid advantage in connection with the O. S. Distributers.

Prevent Friction

Less Joints—No Leaks

Keep Risers in Line

List of Sizes Read same as Tees, viz: (*See cut*)

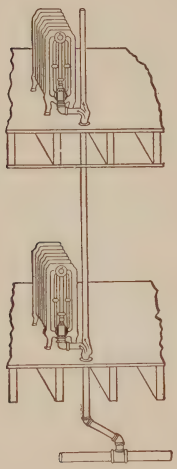
Price List and Dimensions

No.	Tappings, inches 1 | 2 | 3	Dimensions, inches A	B	C	D	List Price Each
10	1 x ¾ x ¾	3⅝	2	2¾	1⅜	$0 60
11	1 x ¾ x 1	3¾	2	2¾	1½	60
12	1 x 1 x ¾	3¾	2	2¾	1⅜	60
13	1 x 1 x 1	4	2¼	3	1½	60
14	1¼ x 1 x 1	4⅜	2⅜	3⅝	2	80
15	1¼ x 1 x 1¼	4½	2½	3¾	2	80
16	1¼ x 1¼ x 1	4⅜	2⅜	3½	2	80
17	1¼ x 1¼ x 1¼	5	2¾	3⅞	2	80
18	1½ x 1¼ x 1	4½	2⅜	3¾	1⅞	90
19	1½ x 1 x 1¼	4¾	2⅝	4	2¼	90
20	1½ x 1¼ x 1¼	4⅝	2⅜	4	2¼	90
21	1½ x 1¼ x 1½	4¾	2½	3⅞	2	90
22	1½ x 1½ x 1¼	4¾	2½	3¾	1⅞	90
23	1½ x 1½ x 1½	5⅛	2¾	4¼	2¼	90
24	2 x 1¼ x 1½	4¾	2⅛	4¼	2¼	1 20
25	2 x 1½ x 1¼	4¾	2⅛	4⅜	2¼	1 20
26	2 x 1½ x 1½	5	2⅛	4½	2¼	1 20
27	2 x 2 x 1¼	4⅞	2½	4½	2¼	1 20
28	2 x 2 x 1½	5¼	2⅛	4½	2¼	1 20
29	2 x 2 x 2	5⅝	2⅞	4¾	2⅜	1 20
30	2½ x 1½ x 1½	5¼	2⅞	4⅞	2½	2 00
31	2½ x 2 x 1½	5⅝	3⅛	5⅜	2½	2 00
32	2½ x 2 x 2	5⅞	3⅛	5¼	2⅝	2 00

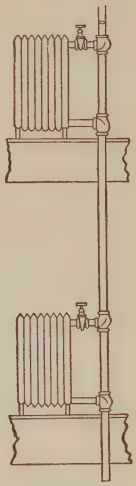
Order by Number.

Carried in stock by us at Chicago, New York, Philadelphia and Boston.

Insure Positive Circulation of Water. No Extra Joints or Fittings to Keep the Riser in Line.



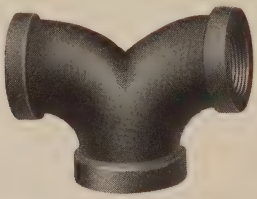
Ordinary System—Return not Shown



"Overhead" System

Twin Ells

For Use in Place of Branch Headers.



Size	Price	Size	Price
1 x ¾	$0.38	3 x 2½	$2.25
1¼ x 1	.52	4 x 3	3.75
1½ x 1¼	.68	5 x 3½	6.75
2 x 1½	.90	5 x 4	6.75
2½ x 2	1.50	6 x 5	9.75

Ideal Radiator Deflecting Shields

Pattern No. 1.

Pattern No. 2

Price List No. 1 Pattern

Sections in Radiator	Galvanized	Painted	Bronzed
10 Sections or less	$3 50	$4 20	$4 35
11 to 15 Sections	4 50	5 30	5 50
16 to 20 "	5 50	6 40	6 70
21 to 25 "	6 50	7 50	7 95
26 to 30 "	7 50	8 60	9 20
31 to 35 "	8 50	9 75	10 00

Price List No. 2 Pattern

Sections in Radiator	Galvanized	Painted	Bronzed	Pol. Brass Lacquered	Pol. Brass Nickel Plated all over
3 Sections	$4 75	$5 55	$5 75	Prices on Application	Prices on Application
4 "	4 75	5 55	5 75		
5 "	4 75	5 55	5 75		
6 "	4 75	5 55	5 75		
7 "	4 75	5 55	5 75		
8 "	4 75	5 55	5 75		
9 "	4 75	5 55	5 75		
10 "	4 75	5 55	5 75		
15 or less	5 75	6 65	6 95		
20 "	7 00	8 00	8 50		
25 "	8 25	9 50	10 00		
30 "	9 50	11 00	12 00		

In ordering state for what pattern of Radiator the Shields are wanted, give height of Radiator, and state whether Radiator is connected single or double pipe, steam or water. Above prices quoted f. o. b. Chicago.

Registers and Ventilators

	BLACK JAPAN			NICKEL PLATED	
Size of Opening	Register	Face	Border	Register	Face
6x 6	$1 50	$0 90	$1 15	$2 70	$2 10
6x 8	1 55	1 00	1 15	2 80	2 25
6x 9	1 60	1 05	1 20	2 95	2 40
6x10	1 60	1 05	1 20	3 00	2 45
7x10	1 65	1 10	1 25	3 10	2 55
8x 8	1 60	1 05	1 20	3 00	2 45
8x10	1 65	1 10	1 25	3 15	2 60
8x12	1 90	1 30	1 50	3 65	3 05
8x15	3 80	2 60	2 60	6 00	4 80
9x12	2 10	1 45	1 65	4 00	3 35
9x14	3 10	2 15	2 15	5 20	4 25
10x12	2 40	1 70	1 75	4 40	3 70
10x14	3 15	2 20	2 20	5 25	4 30
10x16	4 85	2 95	2 95	7 20	5 30
12x15	4 50	2 90	2 90	7 00	5 40
12x16	5 60	3 50	3 50	8 25	6 15
12x17	6 35	3 80	3 80	9 00	6 45
12x18	6 80	3 90	3 90	9 55	6 65
12x19	7 50	4 00	4 00	10 35	6 85
14x18	9 00	4 50	4 50	12 00	7 50
14x20	9 50	4 80	4 80	13 00	8 50
14x22	10 50	5 00	5 00	14 50	9 00
16x20	12 35	6 10	6 10	16 55	10 30

Can furnish any other of the regular size registers and ventilators and at the established list prices therefor. Write for prices and special discounts thereon.

ELECTRO-PLATED IN BRASS, BRONZE OR COPPER FINISHES

Size of Opening	Register	Face	Border	Size of Opening	Register	Face	Border
6x 6	$3 00	$2 40	$2 95	10x14	$6 55	$5 60	$6 00
6x 8	3 10	2 50	3 00	10x16	8 60	6 70	7 20
6x 9	3 40	2 85	3 45	12x15	8 50	6 90	7 60
6x10	3 50	2 95	3 60	12x16	9 75	7 65	8 25
7x10	3 80	3 25	3 80	12x17	10 60	8 05	8 65
8x 8	3 70	3 15	3 65	12x18	11 25	8 35	9 00
8x10	3 85	3 30	3 90	12x19	12 25	8 75	9 25
8x12	4 40	3 75	4 40	14x18	18 50	12 00	12 15
8x15	7 00	5 80	6 40	14x20	20 50	13 00	12 75
9x12	5 10	4 45	5 00	14x22	22 50	14 50	13 50
9x14	6 50	5 50	5 95	16x20	24 60	16 00	14 00
10x12	5 50	4 80	5 35				

Can furnish any other of the regular size registers and at the established list prices therefor. Write for prices and special discounts thereon.

Marble Radiator Tops and Slabs

Having had large experience in supplying marble tops and slabs for radiators, we now confidently offer to our customers what we believe to be an unequaled color, finish and quality, shipping same direct from the quarries.

KIND OF MARBLE	INCHES THICK		
	⅞" or ¾"	1"	1⅛ or 1¼"
Pink Tennessee, per sq. ft. . .	$1 40	$1 60	$1 80
Gray Tennessee, per sq. ft. .	1 40	1 60	1 80
Brown Tennessee, per sq. ft.	1 40	1 60	1 80
Italian (white and gray streaked), per square foot	1 60	1 80	2 00

If Ogee edge is ordered, 20 cents per square foot extra.

Curved or circular tops or slabs, 40 cents per square foot extra. In estimating the superficial area of curved or circular marble, there will be charged whatever waste there may be in cutting same out of block of marble nearest in size that the quarry may have on hand at the time.

Tops or slabs over 6 feet long, in one piece, 80 cents per superficial foot extra.

For each edge polished, add 1 inch to size on tops and slabs ⅞ inch to 1¼ inches thick, and add 2 inches to size on tops and slabs 1½ inches to 2 inches thick.

Slabs of irregular shape, requiring hand-cutting, subject to extra charge.

We do not carry any marble in stock, hence quote Italian marble f. o. b. Baltimore, Md.; Tennessee marble f. o. b. Knoxville, Tenn., or Baltimore, Md.

Radiator Brushes

The brush illustrated above is specially designed for use on radiators, the shape being such that it will pass between the sections, cleaning surfaces which could not otherwise be reached. These brushes are thoroughly well made, and very serviceable. Price each, $0 75.

Ideal Bronze and Bronzing Liquids

After many years of experiment and experience we have at last been successful in obtaining a grade of bronze powder exactly suited to the decorating of AMERICAN RADIATORS. *It lustres like loosened gold.* The bronze is our own direct importation, and a single trial will convince you of the exceptional brilliancy and durability of its lustre, and the very large amount of surface per pound it will cover.

We earnestly believe that the use of a superior quality of bronze in the decorative treatment of Radiators adds greatly to the popularity of heating apparatus among home-lovers.

COLORS—Pale gold, rich gold, copper, silver and aluminum in screw top tin cans containing one pound.

BRONZING LIQUID in gallon, half-gallon and quart patented-stopper cans.

Black Asphaltum

For the painting of boilers and risers, we offer a black asphaltum of great covering capacity and durability, put up in one-gallon cans and in barrels of 30 gallons.

DIRECTIONS FOR USE

BRONZE—Use yellow priming paint (free from oil) for all colors except silver and aluminum, for which a white priming is more suitable. Mix bronze into as much liquid as you will use immediately, sufficient to make it about the consistency of cream. Apply with a fitch brush (bear hair) —do not work it any more than necessary with the brush—cover surface, if possible, with one stroke of brush. Applying bronze when radiators are warm improves the lustre.

LIQUID—Keep the liquid can closed tight when not in use. Liquid left uncorked a very short time evaporates and thickens, and becomes worthless. Do not get any bronze in liquid-can, as the smallest particle will turn it green. Liquid if properly used, will not have to be thinned. Do not use a dirty mixing pot or brush, and see that all dried-up bronze is carefully removed before mixing fresh. One pound of bronze will cover about 300 square feet of radiation, one coat. Proportion, five pounds of bronze to one gallon of liquid.

Ideal Radiator Enamels

SEND FOR COLOR CARD.

To artistically, yet simply, decorate the heating apparatus is frequently a most effective advertisement for the contractor.

We invite attention to our line of clear, rich-hued, Ideal Radiator Enamels (send for sample tint card). The tints offered are delicate yet bright, and by mixing one color with another almost any fashionable shade may be secured to harmonize with the draperies, wall paper or other furnishings of artistic homes. The Enamels are made after our own formula, and we highly recommend them for covering quality and durability. Colors regularly carried in stock, in gallon, half gallon and quart cans are Alabaster, Azure Blue, Light Pink, Oak Brown, Light Drab, Ebony (or black), Apple Green, Gobelin, Silver Gray, Blue Tint, Lilac, Cream, Terra Cotta, Nile Green, Bronze Green, Sea Green. Gloss finish is regularly carried by us in stock except Ebony, which we supply in Flat finish only. Flat finish in other than Ebony color is supplied only on special order.

Ideal Maroon Gloss Japan

We also offer an excellent quality of these goods in gallon, half gallon and quart cans.

DIRECTIONS FOR USE

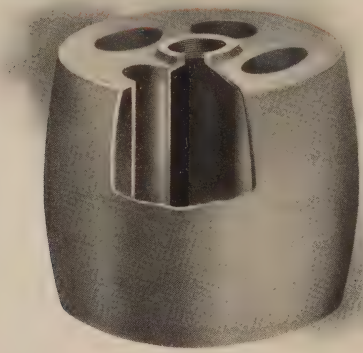
ENAMELS: Radiators should be painted with one coat of flat paint (free from oil) and one or two coats of enamel. Stir enamel thoroughly and apply with an ordinary flat bristle varnish brush. If it thickens add a little turpentine—too much will kill the lustre. Be sure to remove all oil or grease from surface of radiator before applying, or enamel will peel off. Do not flow it on too heavily—two thin coats are far better than one thick. One gallon will cover about 250 square feet of surface. *Caution:* Enamel should be applied when Radiator is *cold*, and heat should not be turned on for at least 24 hours thereafter.

JAPAN: Maroon Gloss Japan settles in a very short time. Is easily stirred if liquid is poured off and the pigment loosened with a putty knife, then gradually adding the liquid again. The *more thoroughly* the liquid is stirred the better will be the result. Thin with turpentine and apply with ordinary flat bristle varnish brush. One coat is sufficient for radiator work. No priming is required; has high gloss, quite equal to Enamel.

Boiler Sundries

Flue Brush, 2, 2½, 3 and 4 in., with handles .	each	$1 50
Flue Brush, 2, 2½, 3 and 4 in., without handles,	"	1 00
Flue Brushes, round, for fire-box boilers, with handles,	"	1 50
Hoe	"	1 50
Poker	"	1 50
Scraper	"	1 50
Slice Bar	"	1 50
Rubber Diaphragm, 7 in., 75c. each; 8 in. . . .	"	1 00
Regulator complete (consisting of diaphragm, rod, weight, rubber and chain)	each	3 00
Blow-off Cock, ¾ in.	"	2 00
Safety Valve (lever), ¾ in., $1 50 each; 1 in., $2 50 each; 1¼ in.	each	3 00
Boiler Putty, 5 lbs., 40c.; 10 lbs.		70

Ideal Auxiliary Water Heaters



For use in the fire pot of any Hot Air Furnace or stove. May be hung close to fire, without obstructing feeding or combustion.

Measurements

Extreme width, 10¾ inches; height, 8¾ inches; tapped at top and bottom for 1¼-inch iron pipe.

Capacity, 140 square feet of direct radiation, or about 170 gallons tank capacity.

Capacity is of course based upon Heater being placed in advantageous position directly above the fire.

List price, each, $10 00.

Directions for Ordering Radiators

1. Give full name of Radiator.
2. With every order give full shipping instructions.
3. Always state whether for Steam or Water, and give heights.
4. If for Steam, specify whether for one or two-pipe work.
5. When ordering leg sections, advise whether for supply or return connection, also stating size of tapping required, and whether for use on one or two-pipe Steam, or for Water.
6. When ordering leg or intermediate sections, it is desirable to give date of invoice covering radiators for which the loose sections are wanted.
7. In ordering radiators, keep as close as possible to regular goods; special tappings and shapes frequently cause delay.
8. For convenience in handling, customers should, as far as possible, avoid ordering Direct Radiators in larger than a 32-section stack. Radiators of 1000 lbs. weight or over are liable to be strained or broken in transportation, and it is recommended that customers order these large radiators to be shipped in halves.
9. In ordering Curved or Corner Radiators, specify exact radius or angle of the baseboard at floor within which the radiator is to be placed, and show by sketch which end of radiator is for supply connection and which for return, as you face the inside of curve or angle.
10. For convenience in handling, Indirect Radiators will be shipped loose. Customers should, when ordering, be particular to specify the size of stacks into which sections are intended to be built, so that necessary supply and return sections may be shipped.
11. All correspondence in relation to orders and shipments should be addressed to the Branch with which order is placed, and not to Plant.
12. Arrange orders after following form (quantity of these printed forms will be promptly mailed to customers, on application), and be sure to sign your orders:

Dated *Chicago, Dec. 1, 1903.*

When Wanted *At once.*

AMERICAN RADIATOR CO.,
CHICAGO, ILL.

Our Order No. *1000*

Ship to *John Doe,*

Via *R. R.* *Kansas City,*

the following **Radiators.** *Mo.*

Charge to

Richard Roe,

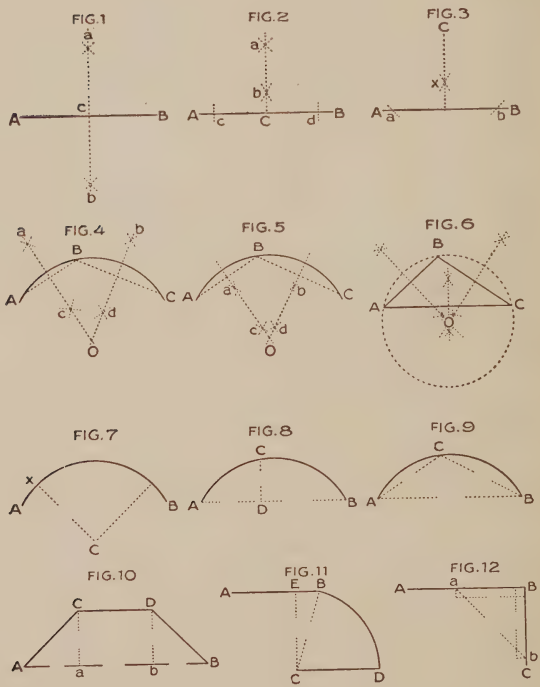
Chicago, Ill.

No. of Radiators	Sections	Height	Kind	Style	Tapped	Remarks
3	*8*	*38*	*Steam*	*Verona*	*2-pipe regular*	

(Sign here)

Instructions in Geometrical Drawing

Instructions in Geometrical Drawing, to aid the steamfitter in making accurate drawing to show exact radius or angle within which Curved or Corner Radiator is to be placed.



For explanation of above drawings, see pages 189 and 190.
For list of Curved and Corner or Angle Radiators made at our Plants, see pages 112, 115 and 117.

Instructions in Geometrical Drawing

Continued

To bisect a line

Fig. 1. With point *A* as a center, and a radius greater than one-half *A B*, describe the arcs *a* and *b*. With *B* as a center using radius equal to *A a*, describe arcs *b* and *b*. A line drawn through intersections of arcs *a* and *b* will divide line *A B* into two equal parts, as *A c* and *c B*.

To erect a perpendicular at a given point in a line

Fig. 2. At equal distances from the given point *C* in the line *A B*, lay off points *c* and *d*. With *c* as a center and with a radius greater than one-half of *c d*, describe arc *a*. With *d* as a center and using radius equal to *c a*, describe intersecting arc *a*.

With *c* and *d* as centers and a radius less than *c a* but greater than one-half of *c d*, describe the arcs which intersect at *b*. A line drawn through the intersecting arcs *a* and *b* will be perpendicular to line *A* and *B* at the given point *C*.

From a given point without a line, to let fall a perpendicular to that line

Fig. 3. With given point *C* as a center and a radius greater than the distance from *C* to line *A B*, describe an arc of a circle which will intersect the line in two places, as *a* and *b*. With *a* and *b* as centers and equal radii, describe arcs which intersect at *x*. A line drawn from point *C* through intersection of arcs to line *A B* will be perpendicular to that line.

The arc of a circle being given, to find the center of the circle of which the arc is a part

Fig. 4. On the arc *A B C* take any three points as *A B C*. Join points *A*, *B* and *C* by lines *A B* and *B C*. Bisect lines *A B* and *B C* by method shown in Fig. 1. The bisecting lines *o a* and *o b* will intersect at point *o*, which will be the center of the circle of which the arc *A B C* is a part.

Fig. 5. Same as Fig. 4, excepting that in bisecting lines *A B* and *B C* the intersecting arcs are all within the circle.

Instructions in Geometrical Drawing

Continued

To circumscribe a circle about a given triangle

Fig. 6. Bisect the sides *A B*, *B C* and *A C*, of the triangle *A B C*. The three bisectors will meet at point *O*. With *O* as a center and radius equal to *O B*, draw circle *A B C*. In taking measurements for curved or angular radiators, be sure that measurements are taken from base-board, or projections which the radiator must clear.

For curved radiators, give us either the radius, as in Fig. 7, or, as in Fig. 8, the length of the line *A B*; the length of the perpendicular let fall from point *C* to line *A B*, and the distance of the perpendicular from points *A* and *B*, as *A D* and *D B*. Or take any three points in the arc *A B C*, in Fig. 9, and give length of sides of triangle formed by joining these points.

For angular radiators, it is necessary that we know the exact angle to which the radiator must conform. We want, therefore, sufficient information to enable us to lay out angles correctly.

Fig. 10. Take any two points on the sides *A C* and *D B*, as *A B*, and join them with line *A B*. From the vertex of angle *C* let fall a perpendicular to line *A B*, as *C a*. From vertex of angle *D* let fall a perpendicular to line *A B*, as *D b*. Then give us the following dimensions: *A a*, *a b*, *b B*, *a C* and *b D*.

Fig. 11. Determine the radius of arc *B D* by method shown in Figs. 4 or 5. From point *C*, the center of circle of which arc *B D* is a part, erect a perpendicular to line *A B*, as *C E*. Give length of radius *C B* and perpendicular *C E*.

Fig. 12. With the vertex of the angle *B* as a center, lay off equal distances *B a* and *B b*. Join points *a* and *b*, and give lengths of sides *a B*, *B b* and *a b* of the triangle thus formed.

Capacities for Greenhouses and Conservatories

Ideal Sectional Steam Boilers

Number	Height of Center of Return, inches	Lin. ft. 1¼ in. W. I. Pipe*	Lin. ft. 1 in. W. I. Pipe*	Sq. ft. Glass 40° to 45° zero weather	Sq. ft. Glass 45° to 50° zero weather	Sq. ft. Glass 50° to 55° zero weather	Sq. ft. Glass 55° to 60° zero weather	Sq. ft. Glass 60° to 65° zero weather	Sq. ft. Glass 65° to 70° zero weather
18-inch Series.									
084	16	570	720	2150	1940	1760	1620	1490	1390
085	16	760	960	2870	2580	2350	2150	1990	1850
086	16	950	1200	3590	3230	2930	2690	2480	2400
087	16	1080	1360	4100	3740	3360	3080	2840	2640
088	16	1220	1540	4620	4160	3780	3470	3200	2970
21-inch Series.									
S-21-5	17½	1080	1360	4100	3740	3360	3080	2840	2640
S-21-6	17½	1400	1760	5400	4800	4300	4000	3700	3400
S-21-7	17½	1670	2100	6500	5800	5180	4770	4400	4100
S-21-8	17½	1940	2450	7400	6700	6000	5500	5100	4800
S-21-9	17½	2110	2660	8000	7300	6600	6000	5600	5000
24-inch Series									
045	18¾	1310	1650	4910	4500	4100	3730	3420	3200
046	18¾	1620	2040	6120	5580	5060	4620	4270	3960
047	18¾	1950	2460	7380	6750	6100	5580	5130	4790
048	18¾	2130	2680	8060	7350	6660	6300	5620	5220
049	18¾	2430	3060	9180	8390	7590	6930	6390	5960
30-inch Series									
S-30-5	19⅛	1530	1930	5760	5270	4770	4370	4050	3740
S-30-6	19⅛	1950	2460	7380	6710	6100	5580	5170	4790
S-30-7	19⅛	2360	2970	8890	8100	7380	6750	6230	5780
S-30-8	19⅛	2790	3520	10530	9540	8730	8240	7380	6840
S-30-9	19⅛	3150	3970	11880	10800	9770	9000	8330	7740
S-30-10	19⅛	3600	4540	13550	12330	11250	10260	9500	8820
36-inch Series									
065	20⅜	2160	2720	8190	7430	6750	6140	5720	5310
066	20⅜	2930	3690	11030	9980	9060	8330	7740	7200
067	20⅜	3380	4260	12780	11540	10530	9630	8890	8280
068	20⅜	3830	4830	14400	13140	11970	10890	10080	9360
069	20⅜	4280	5390	16110	14720	13320	12150	11300	10440
0610	20⅜	4730	5960	17820	16200	14760	13500	12470	11570

*NOTE—In all cases the boiler should be proportioned to the amount of glass surface for the different temperatures. When it is intended to use soft coal for fuel, it is recommended that a size larger boiler be figured than when hard coal is to be used.

Capacities for Greenhouses and Conservatories

Ideal Sectional Water Boilers

Number	Height of Center of Return, inches	Lineal ft. 4 in. outside Diam. C. I. Pipe	Lineal ft. 2 in. W. I. Pipe (Note)	Sq. ft. Glass 40° to 45° zero weather	Sq. ft. Glass 45° to 50° zero weather	Sq. ft. Glass 50° to 55° zero weather	Sq. ft. Glass 55° to 60° zero weather	Sq. ft. Glass 60° to 65° zero weather	Sq. ft. Glass 65° to 70° zero weather
18-inch Series.									
184	16	630	1000	2390	2150	1960	1800	1660	1540
185	16	840	1340	3190	2870	2610	2390	2210	2050
186	16	1050	1680	3990	3590	3260	2990	2760	2670
187	16	1200	1920	4560	4150	3731	3420	3160	2930
188	16	1350	2150	5130	4620	4200	3850	3550	3300
21-inch Series.									
W-21-5	17½	1200	1920	4560	4150	3730	3420	3160	2930
W-21-6	17½	1550	2480	6000	5350	4800	4420	4070	3800
W-21-7	17½	1850	2950	7200	6400	5750	5300	4870	4550
W-21-8	17½	2150	3450	8200	7400	6700	6120	5650	5300
W-21-9	17½	2350	3770	8930	8100	7300	6700	6200	5500
24-inch Series									
245	18¾	1450	2300	5460	5000	4550	4140	3800	3550
246	18¾	1800	2870	6800	6200	5620	5130	4740	4400
247	18¾	2170	3470	8200	7500	6780	6200	5700	5320
248	18¾	2370	3800	8950	8170	7400	7000	6240	5800
249	18¾	2700	4320	10200	9320	8430	7700	7100	6620
30-inch Series									
W-30-5	19⅛	1700	2720	6400	5850	5300	4850	4500	4160
W-30-6	19⅛	2170	3470	8200	7450	6780	6200	5740	5320
W-30-7	19⅛	2620	4200	9880	9000	8200	7500	6920	6420
W-30-8	19⅛	3100	4950	11700	10600	9700	9150	8200	7600
W-30-9	19⅛	3500	5600	13200	12000	10850	10000	9250	8600
W-30-10	19⅛	4000	6400	15050	13700	12500	11400	10550	9800
36-inch Series									
365	20⅜	2400	3840	9100	8250	7500	6820	6350	5900
366	20⅜	3250	5200	12250	11090	10070	9250	8600	8000
367	20⅜	3750	6000	14200	12820	11700	10700	9880	9200
368	20⅜	4250	6800	16000	14600	13300	12100	11200	10400
369	20⅜	4750	7600	17900	16350	14800	13500	12550	11600
3610	20⅜	5250	8400	19800	18000	16400	15000	13850	12850

NOTE—In all cases the boiler should be proportioned to the amount of glass surface for the different temperatures. When it is intended to use soft coal for fuel, it is recommended that a size larger boiler be figured than when hard coal is to be used.

Capacities for Greenhouses and Conservatories

Premier Steam Boilers

Number	Lineal ft. 1¼ in W. I. Pipe (See Note)	Lineal ft. 1 in. W. I. Pipe (See Note)	Sq. ft. Glass 40° to 45° zero weather	Sq. ft. Glass 45° to 50° zero weather	Sq. ft. Glass 50° to 55° zero weather	Sq. ft. Glass 55° to 60° zero weather	Sq. ft. Glass 60° to 65° zero weather	Sq. ft. Glass 65° to 70° zero weather
Steam Boilers, Hard Coal								
A-015	325	410	1220	1120	1010	920	860	790
A-018	470	590	1760	1610	1460	1330	1230	1140
A-019	510	640	1940	1760	1600	1460	1350	1260
A-020	590	740	2210	2030	1840	1670	1540	1430
A-021	650	820	2450	2220	2030	1850	1710	1580
A-022	710	900	2670	2430	2210	2030	1870	1740
A-024	760	960	2850	2590	2370	2160	1980	1850
A-025	850	1070	3200	2900	2630	2400	2250	2070
A-026	930	1170	3490	3180	2900	2650	2450	2270
A-027	1040	1310	3920	3580	3260	2970	2750	2560
A-028	1150	1450	4340	3940	3600	3270	3010	2810
A-029	1260	1590	4740	4230	3920	3600	3330	3090
A-031	1350	1700	5090	4640	4200	3840	3560	3310
A-032	1500	1890	5670	5150	4680	4280	3960	3960
A-033	1650	2080	6210	5650	5130	4680	4360	4030
Steam Boilers, Soft Coal								
B-015	297	374	1130	1020	930	850	780	730
B-018	420	530	1590	1450	1310	1210	1120	1040
B-021	590	740	2210	2010	1830	1670	1550	1430
B-022	650	820	2450	2220	2030	1850	1710	1580
B-025	770	970	2880	2630	2390	2180	2030	1860
B-026	840	1060	3150	2880	2610	2390	2210	2040
B-028	1040	1310	3910	3550	3230	2950	2740	2540
B-029	1130	1420	4190	3890	3540	3230	2990	2780
B-032	1350	1700	5090	4640	4200	3840	3560	3310
B-033	1490	1880	5600	5090	4640	4230	3920	3650

NOTE—In all cases the boiler should be proportioned to the amount of glass surface for the different temperatures.

Capacities for Greenhouses and Conservatories

Premier Water Boilers

Number	Lineal ft. 4 in. outside Diam C. I. Pipe (Note)	Lineal ft. 2 in. W. I. Pipe (Note)	Sq. ft. Glass 40° to 45° zero weather	Sq. ft. Glass 45° to 50° zero weather	Sq. ft. Glass 50° to 55° zero weather	Sq. ft. Glass 55° to 60° zero weather	Sq. ft. Glass 60° to 65° zero weather	Sq. ft. Glass 65° to 70° zero weather
Water Boilers, Hard Coal								
A-152	360	575	1360	1240	1120	1020	950	880
A-182	520	830	1960	1790	1620	1480	1370	1270
A-183	570	910	2150	1950	1780	1620	1500	1400
A-211	650	1040	2450	2250	2040	1850	1710	1590
A-212	720	1150	2720	2470	2250	2050	1900	1760
A-213	790	1260	2970	2700	2450	2250	2080	1930
A-241	840	1340	3170	2880	2630	2400	2200	2050
A-242	940	1500	3550	3220	2920	2670	2500	2300
A-243	1030	1650	3880	3530	3220	2940	2720	2520
A-281	1160	1850	4360	3980	3620	3300	3060	2840
A-282	1280	2050	4820	4380	4000	3630	3340	3120
A-283	1400	2240	5270	4700	4360	4000	3700	3430
A-321	1500	2400	5650	5150	4670	4270	3960	3680
A-322	1670	2670	6300	5720	5200	4760	4400	4100
A-323	1830	2930	6900	6280	5700	5200	4840	4480
Junior Water Boilers, Hard Coal								
101	100	160	380	350	320	290	270	250
121	140	224	530	480	430	400	370	343
122	180	288	680	617	562	512	475	440
151	260	415	980	892	810	740	687	637
152	300	480	1170	1070	940	850	790	735
181	460	735	1720	1580	1440	1310	1220	1120
Water Boilers, Soft Coal								
B-152	330	530	1250	1130	1030	940	870	810
B-182	470	750	1770	1610	1460	1340	1240	1150
B-212	650	1040	2450	2230	2030	1850	1720	1590
B-213	720	1150	2720	2470	2250	2050	1900	1760
B-242	850	1360	3200	2920	2650	2420	2250	2070
B-243	930	1460	3500	3200	2900	2650	2450	2270
B-282	1150	1840	4340	3940	3590	3280	3040	2820
B-283	1260	2200	4650	4320	3930	3590	3320	3090
B-322	1500	2400	5650	5150	4670	4270	3960	3680
B-323	1650	2640	6220	5660	5150	4700	4350	4050

NOTE—In all cases the boiler should be proportioned to the amount of glass surface for the different temperatures.

When flow and return mains are to be cast iron, outlets suitable for calking are provided.

Area of Circles

Size	Area	Size	Area	Size	Area	Size	Area
⅛	0.0123	10	78.54	30	706.86	65	3318.3
¼	0.0491	½	86.59	31	754.76	66	3421.2
⅜	0.1104	11	95.03	32	804.24	67	3525.6
½	0.1963	½	103.86	33	855.30	68	3631.6
⅝	0.3067	12	113.09	34	907.92	69	3739.2
¾	0.4417	½	122.71	35	962.11	70	3848.4
⅞	0.6013	13	132.73	36	1017.8	71	3959.2
1	0.7854	½	143.13	37	1075.2	72	4071.5
⅛	0.9940	14	153.93	38	1134.1	73	4185.3
¼	1.227	½	165.13	39	1194.5	74	4300.8
⅜	1.484	15	176.71	40	1256.6	75	4417.8
½	1.767	½	188.69	41	1320.2	76	4536.4
⅝	2.073	16	201.06	42	1385.4	77	4656.0
¾	2.405	½	213.82	43	1452.2	78	4778.3
⅞	2.761	17	226.98	44	1520.5	79	4901.6
2	3.141	½	240.52	45	1590.4	80	5026.5
¼	3.976	18	254.46	46	1661.9	81	5153.0
½	4.908	½	268.80	47	1734.9	82	5281.0
¾	5.939	19	283.52	48	1809.5	83	5410.6
3	7.068	½	298.64	49	1885.7	84	5541.7
¼	8.295	20	314.16	50	1963.5	85	5674.5
½	9.621	½	330.06	51	2042.8	86	5808.8
¾	11.044	21	346.36	52	2123.7	87	5944.6
4	12.566	½	363.05	53	2206.1	88	6082.1
½	15.904	22	380.13	54	2290.2	89	6221.1
5	19.635	½	397.60	55	2375.8	90	6361.7
½	23.758	23	415.47	56	2463.0	91	6503.8
6	28.274	½	433.73	57	2551.7	92	6647.6
½	33.183	24	452.39	58	2642.0	93	6792.9
7	38.484	½	471.43	59	2733.9	94	6939.7
½	44.178	25	490.87	60	2827.4	95	7088.2
8	50.265	26	530.93	61	2922.4	96	7238.2
½	56.745	27	572.55	62	3019.0	97	7389.8
9	63.617	28	615.75	63	3117.2	98	7542.9
½	70.882	29	660.52	64	3216.9	99	7697.7

To find the circumference of a circle when diameter is given, multiply the given diameter by 3.1416.

To find the diameter of a circle when circumference is given, multiply the given circumference by .31831.

Properties of Saturated Steam

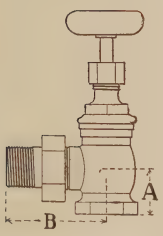
PRESSURE IN LBS.		Temperature in Degrees Fahr.	VOLUME		Latent Heat in Degrees Fahr.	Total Heat from Water at 32°. In Heat Units
By Steam Gauge	Above Atmosphere		Compared with Water	Cubic Foot of Steam from 1 lb. of Water		
0	15	212.0	1642	26.36	965.2	1146.1
5	20	228.0	1229	19.72	952.8	1150.9
10	25	240.1	996	15.99	945.3	1154.6
15	30	250.4	838	13.46	937.9	1157.8
20	35	259.3	726	11.65	931.6	1160.5
25	40	267.3	640	10.27	926.0	1162.9
30	45	274.4	572	9.18	920.9	1165.1
35	50	281.0	518	8.31	916.3	1167.1
40	55	287.1	474	7.61	912.0	1169.0
45	60	292.7	437	7.01	908.0	1170.7
50	65	298.0	405	6.49	904.2	1172.3
55	70	302.9	378	6.07	900.8	1173.8
60	75	307.5	353	5.68	897.5	1175.2
65	80	312.0	333	5.35	894.3	1176.5
70	85	316.1	314	5.05	891.4	1177.9
75	90	320.2	298	4.79	888.5	1179.1
80	95	324.1	283	4.55	885.8	1180.3
85	100	327.9	270	4.33	883.1	1181.4
90	105	331.3	257	4.14	880.7	1182.4
95	110	334.6	247	3.97	878.3	1183.5
100	115	338.0	237	3.80	875.9	1184.5
110	125	344.2	219	3.51	871.5	1186.4
120	135	350.1	203	3.27	867.4	1188.2
130	145	355.6	190	3.06	863.5	1189.9
140	155	361.0	179	2.87	859.7	1191.5
150	165	366.0	169	2.71	856.2	1192.9
160	175	370.8	159	2.56	852.9	1194.4
170	185	375.3	151	2.43	849.6	1195.8
180	195	379.7	144	2.31	846.5	1197.2

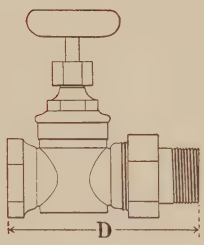
Pressure of Water for Each Foot in Height

Feet in Height	Pounds per Sq. Inch	Feet in Height	Pounds per Sq. Inch	Feet in Height	Pounds per Sq. Inch
1	.43	15	6.49	50	21.65
2	.86	20	8.66	70	30.32
5	2.16	25	10 82	80	34.65
10	4.33	40	17.32	100	43.31

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

Measurements of Valves and Elbows





Size, inches		¾	1	1¼	1½	2
Nos. 10 to 14 Valves	A	$1\frac{7}{16}$	1⅝	2	2¼	2¾
Nos. 60 to 64 "	B	2¾	3¼	3½	4	4¾
Nos. 70 to 74 "	A	$1\frac{7}{16}$	1⅝	2	2¼	2¾
Nos. 99 to 103 "	B	2¾	3	3½	4	4¾
Nos. 114 to 118 Valves	D	4¼	4¾	5¾	6¾	7½
Nos. 130 to 134 Union Elbows	A	$1\frac{7}{16}$	1⅝	2	2⅜	3
	B	2¾	3	3½	4	4¾
No. 335 Gate Valve	D	2½	2⅞	3¼	3½	4⅛
No. 373 "	D	4	4½	5	5½	6⅜

Expansion of Wrought Iron Pipe

Temperature of the Air when Pipe is fitted	Length of Pipe when fitted	Length of Pipe when heated to							
		215°		265°		297°		338°	
		Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
Zero	100 feet	100	1.72	100	2.12	100	2.31	100	2.70
32°	100 "	100	1.47	100	1.78	100	2.12	100	2.45
64°	100 "	100	1.21	100	1.61	100	1.87	100	2.19

To Properly Erect Coal, Coke and Wood Burning Sectional Steam and Water Boilers

Set up and bolt together squarely the four pieces comprising the base, on a level brick or concrete foundation, which is at least a foot larger all round than the base.

Place all of the grates in position and connect them to the horizontal shaking bar underneath them. Connect this bar through the front of the base to the angle shaking lever, which is fastened to the front section by means of a bracket.

Place on top of the base, and close up against the base front the front section, which is marked No. 1. Wipe clean its three nipple holes, also any three of the connecting nipples; smear them with good lubricating oil; place them in the front section; add the second section marked No. 2, after having carefully wiped clean its six nipple holes, pushing the section up until its front nipple holes register with the nipples already placed in the front section. Jar section No. 2 up close to the first one with a piece of timber. Place the four long connecting bolts in their holes, slipping on each, at the rear, one of the square wood washers which we supply. Screw up *equally all around*, meanwhile striking the rear section, in the vicinity of the three connecting holes, with a block of wood and a good heavy hammer.

When the sections are within ¼ or 3-16 of an inch of each other (*square all round*) then insert four wooden wedges, which are to go between each and every section before they are pulled up any further, one on each side just above the lower connecting nipples and two on top. These two as far away from the upper connecting nipple as possible. Then screw a little more on the nuts until the wedges have been bitten by the two sections, and the sections have been drawn together from center to center of each section the following distances:

18"	Coal	Burning	Boiler	6"	from	Center	to	Center	of	Sections	
21"	"	"	"	7"	"	"	"	"	"	"	
24"	"	"	"	7¼"	"	"	"	"	"	"	
30"	"	"	"	7¼"	"	"	"	"	"	"	
36"	"	"	"	8¼"	"	"	"	"	"	"	
No. 1	Coke	"	"	4"	"	"	"	"	"	"	
" 2	"	"	"	5½"	"	"	"	"	"	"	
" 3	"	"	"	6"	"	"	"	"	"	"	
" 4	"	"	"	7¼"	"	"	"	"	"	"	
" 5	"	"	"	8¼"	"	"	"	"	"	"	

Then remove the screw rods, add the next section, precisely as before, and repeat the operation just described, sawing off each time, where they have been marked, a portion of the square wood washers.

If impossible to begin to erect at the front section of boiler, start with the back section, as above described.

After boiler has been assembled complete, be sure to cement all joints (which are all points of contact) between sections, breaking off the wood wedges, allowing their points to remain undisturbed between the sections, applying cement over them. Cement all joints in base and between base and foundation, remembering that all air for combustion should enter only through the draft doors.

Smoke pipe and all connections between boiler and flue should be air tight (a leak in the smoke pipe or connections is like a leak in a suction pump).

Do not bush the flow outlets in steam dome. Connect all of them to the flow pipe system, using size of pipe called for by outlets.

Do not expect the boiler to do good work until the system has been thoroughly cleared of oil.

A good damper (accessible and easily handled) in smoke pipe near chimney, provided with means for clamping in order that it may remain where desired, is usually very necessary for draft regulation and fuel saving

No boiler will operate successfully on a weak draft, nor will it give satisfaction on a strong draft *if the flue area is too small.* (Do not mistake velocity for volume. A test by burning paper in a flue proves nothing.)

Each pound of coal requires for its complete combustion about three hundred cubic feet of air.

To draw this amount of air through the grates, ashes and fuel bed, over various heating surfaces and through flues, the proper area and height of chimney are essential.

How to Clean a Water Gauge Glass on a Steam Boiler Without Removing Same

1. Draw a cupful of hot water from the boiler, into which pour at least a tablespoonful of *raw muriatic or other acid;*

2. Close both water gauge valves;

3. Open top water gauge valve and also pet cock at bottom, and blow water out of the glass. Then immediately close the top valve and submerge the end of the pet cock in cup of hot water solution. A vacuum is at once created in the gauge glass which causes the solution in the cup to rush in.

4. Keep the pet cock immersed and operate the top valve, slightly opening and closing, alternately expelling and drawing in the solution until all grease, oil or other matter adhering to the inside of the glass is cut out. Then close pet cock and *open both water gauge valves.*

It is necessary to have *one pound pressure of steam or more* on the boiler before commencing this operation, which need not occupy more than ten minutes. The result is a clean glass without the risk of breakage and probable renewal of gaskets, which is *frequently the case when removing the glass for cleaning.*

Removing Oil and Grit from Steam Boiler

Unavoidable accumulations of oil, grease or grit in a new system causes a boiler to foam, prevents generation of steam, and produces an unsteady water line; therefore it is necessary to *blow off boiler under pressure.*

1. Close off the main steam and return valves, *or all Radiator valves.*

2. Make a wood fire and get up a pressure of at least ten pounds as indicated by the steam gauge.

3. Open the blow-off valves, being careful that just sufficient fire is carried to maintain a pressure until the last gallon of water is exhausted.

4. Allow fire to die out.

5. Open all fire and flue doors and in about half an hour

6. Close blow-off valve and

7. Refill boiler slowly to water line.

8. Open all radiator and main valves and

9. Start fire.

A boiler should be blown off within a week after it is installed and in operation. If one blowing off does not result in a clean water gauge glass, proper generation of steam and a steady water line, the boiler should be blown off a second, and if necessary a third and fourth time.

Heat Units and Weight of Water

Heat units in water, between 32 and 212 degrees Fahrenheit and weight of water per cubic foot.

Tem. Deg. Fahr.	Heat Units	Weight, lbs. per cub. ft.	Tem. Deg. Fahr.	Heat Units	Weight, lbs. per cub. ft.	Tem. Deg. Fahr.	Heat Units	Weight lbs. per cub. ft.
32	0.	62.42	123	91.16	61.68	168	136.44	60.81
35	3.	62.42	124	92.17	61.67	169	137.45	60.79
40	8.	62.42	125	93.17	61.65	170	138.45	60.77
45	13.	62.42	126	94.17	61.63	171	139.46	60.75
50	18.	62.41	127	95.18	61.61	172	140.47	60.73
52	20.	62.40	128	96.18	61.60	173	141.48	60.70
54	22.01	62.40	129	97.19	61.58	174	142 49	60.68
56	24.01	62.39	130	98.19	61.56	175	143.50	60.66
58	26.01	62.38	131	99.20	61.54	176	144.51	60.64
60	28.01	62.37	132	100.20	61.52	177	145.52	60.62
62	30.01	62.36	133	101.21	61.51	178	146.52	60.59
64	32.01	62.35	134	102.21	61.49	179	147.53	60.57
66	34.02	62.34	135	103.22	61.47	180	148.54	60.55
68	36.02	62.33	136	104.22	61.45	181	149.55	60 53
70	38.02	62.31	137	105.23	61.43	182	150.56	60.50
72	40 02	62.30	138	106.23	61.41	183	151.57	60.48
74	42.03	62.28	139	107.24	61.39	184	152.58	60.46
76	44.03	62.27	140	108.25	61.37	185	153.59	60.44
78	46.03	62.25	141	109.25	61.36	186	154.60	60.41
80	48.04	62.23	142	110.26	61.34	187	155.61	60.39
82	50.04	62.21	143	111.26	61.32	188	156.62	60.37
84	52.04	62.19	144	112.27	61.30	189	157.63	60 34
86	54.05	62.17	145	113.28	61.28	190	158.64	60.32
88	56.05	62.15	146	114.28	61.26	191	159.65	60.29
90	58.06	62.13	147	115.29	61.24	192	160.67	60.27
92	60.06	62.11	148	116.29	61.22	193	161.68	60.25
94	62.06	62.09	149	117.30	61.20	194	162.69	60.22
96	64.07	62.07	150	118.31	61.18	195	163.70	60.20
98	66.07	62.05	151	119.31	61.16	196	164.71	60.17
100	68.08	62.02	152	120.32	61.14	197	165.72	60.15
102	70.09	62.00	153	121.33	61.12	198	166.73	60.12
104	72.09	61.97	154	122.33	61.10	199	167.74	60.10
106	74.10	61.95	155	123 34	61.08	200	168.75	60.07
108	76.10	61.92	156	124.35	61.06	201	169.77	60.05
110	78.11	61.89	157	125.35	61.04	202	170.78	60.02
112	80.12	61 86	158	126.36	61.02	203	171.79	60.00
114	82.13	61 83	159	127.37	61.00	204	172.80	59.97
115	83.13	61.82	160	128.37	60.98	205	173.81	59.95
116	84.13	61.80	161	129.38	60.96	206	174.83	59.92
117	85.14	61.78	162	130.39	60.94	207	175.84	59.89
118	86.14	61.77	163	131.40	60.92	208	176.85	59.87
119	87.15	61.75	164	132.41	60.90	209	177.86	59.84
120	88.15	61.74	165	133.41	60.87	210	178.87	59.82
121	89.15	61.72	166	134.42	60.85	211	179.89	59.79
122	90.16	61.70	167	135.43	60.83	212	180.90	59.76

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

Square Feet of Radiating Surface of Pipe per Lineal Foot

On all lengths over one foot, fractions less than tenths are added to or dropped.

Length of Pipe	SIZE OF PIPE											
	¾	1	1¼	1½	2	2½	3	4	5	6	7	8
1	.275	.346	.434	.494	.622	.753	.916	1.175	1.455	1.739	1.996	2.257
2	.5	.7	.9	1.	1.2	1.5	1.8	2.4	2.9	3.5	4.	4.5
3	.8	1.	1.3	1.5	1.9	2.3	2.7	3.5	4.4	5.2	6.	6.8
4	1.1	1.4	1.7	2.	2.5	3.	3.6	4.7	5.8	7.	8.	9.
5	1.4	1.7	2.2	2.4	3.1	3.8	4.6	5.8	7.3	7.7	10.	11.3
6	1.6	2.1	2.6	2.9	3.7	4.5	5.5	7.	8.7	10.5	12.	13.5
7	1.9	2.4	3.	3.4	4.4	5.3	6.4	8.2	10.2	12.1	14.	15.8
8	2.2	2.8	3.5	3.9	5.	6.	7.3	9.4	11 6	13.9	16.	18.
9	2.5	3.1	3.9	4.4	5.6	6.8	8.2	10.6	13.1	15.7	18.	20.3
10	2.7	3.5	4 3	4.9	6.2	7.5	9.1	11.8	14.6	17.4	20.	22.6
11	3.	3.8	4.8	5.4	6.8	8.3	10.	12.9	16.	19.1	22.	24.9
12	3.3	4.1	5.2	5 9	7.5	9.	11.	14.1	17.4	20.9	24.	27.1
13	3.6	4.5	5.6	6.4	8.1	9.8	11.9	15.3	18.9	22.6	26.	29.4
14	3 8	4.8	6.1	6.9	8.7	10.5	12.8	16.5	20.3	24.3	28.	31 6
15	4.1	5.2	6.5	7.4	9.3	11.3	13.7	17.6	21.8	26.1	30.	33.9
16	4.4	5.5	6.9	7.9	10.	12.	14.6	18.8	23.2	27 8	32.	36.1
17	4.7	5.9	7.4	8.4	10.6	12.8	15.5	20.	24.7	29.5	34.	38.4
18	5.	6.2	7.8	8.9	11.2	13.5	16.5	21.2	26 2	31.3	36.	40.6
19	5 2	6.6	8.3	9.4	11.8	14.3	17.4	22.3	27.6	33.1	38.	42.9
20	5.5	6.9	8.7	9.9	12.5	15.	18 3	23.5	29.1	34.8	40.	45.2
21	5.8	7.3	9.1	10.4	13.	15.8	19.2	24.7	30.5	36.5	42.	47.4
22	6.	7.6	9.6	10.9	13.7	16.5	20.2	25.9	32.	38.3	44.	49.7
23	6.3	8.	10.	11.3	14.3	17.3	21.1	27.	33.5	40.	46.	52.
24	6.6	8.3	10.4	11.9	14.9	18.	22.	28.2	34.9	41.7	48.	54.2
25	6.9	8.6	10.9	12.3	15.6	18.8	22.9	29.3	36.3	43.5	50.	56.4
26	7 1	9.	11.3	12.8	16.2	19.5	23.8	30.5	37.8	45.2	52.	58 6
27	7.4	9.4	11.7	13 3	16.8	20.3	24.7	31.7	39.3	47.	54.	61.
28	7.7	9.7	12.2	13.8	17.4	21.	25.6	32.9	40.7	48.7	56.	63.2
29	8.	10.	12.6	14.3	18.	21.8	26.6	34 1	42.2	50.4	58.	65.5
30	8.3	10.4	13.	14 8	18.7	22.5	27.5	35.3	43.6	52.1	60.	67.7
31	8.5	10.7	13.5	15.3	19.3	23.3	28.4	36.4	45.1	53.9	62.	70.
32	8.8	11.1	13.9	15.8	19.9	24.1	29.3	37.6	46.5	55.6	64.	72.2
33	9.1	11.4	14.3	16.3	20.5	24.8	30.2	38.8	48.	57.4	66.	74.4
34	9.4	11.7	14.7	16.8	21.2	25.6	31.1	40.	49.5	59.1	68.	76.7
35	9.6	12.1	15 2	17.3	21.8	26.3	32.	41.1	50.9	60.8	70.	79.
36	9.9	12.5	15.6	17.8	22.4	27.	33.	42.3	52 4	62.6	72.	81.3
37	10.2	12.8	16.1	18.3	23.	27.8	33.9	43.5	53.8	64.3	74.	83.5
38	10.5	13 2	16.5	18.8	23.7	28.5	34.8	44.6	55 2	66.	76.	85.8
39	10.7	13.5	16.9	19.3	24.3	29.3	35.7	45.8	56.7	67.8	78.	88.
40	11.	13.8	17.4	19.8	24.9	30.1	36.6	47.	58.2	69.5	80.	90.2
41	11.3	14 2	17.8	20.3	25.5	30.8	37.6	48.2	59.6	71.3	82.	92.5
42	11.5	14.5	18.2	20.8	26.1	31.6	38.5	49.4	61.1	73.	84.	94.8
43	11.8	14.9	18.7	21.3	26.8	32.3	39.4	50.6	62.5	74.8	86.	97.
44	12.1	15.2	19.1	21.8	27.4	33.1	40.3	51.7	64.	76.5	88.	99.3
45	12.4	15.6	19.5	22.2	28.	33.8	41.2	52.9	65.5	78.2	90.	101.6
46	12.7	15.9	20.	22.7	28.6	34.6	42.2	54.	67.	80.	92.	103.8
47	12.9	16.3	20.4	23.2	29.2	35.3	43.	55.2	68.4	81.7	94.	106.
48	13.2	16.6	20.8	23.7	29.9	36.1	43.9	56.4	69.8	83 5	96.	108.4
49	13.5	17.	21.3	24.2	30.5	36.8	44.8	57.6	71.2	85.1	98.	110.5
50	13.8	17.3	21.7	24.7	31.1	37.6	45.8	58.7	72.7	87.	100.	112.8

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

Capacities of Wrought Iron Pipe

Inside diameter Inches	1	1¼	1½	2	2½	3	3½	4	5	6
Length of Pipe per square foot of external surface	2.9	2.3	2.0	1.6	1.32	1.09	0.95	0.84	0.68	0.57
Square feet surface per 1 lineal foot	0.34	0.43	0.50	0.62	0.75	0.92	1.05	1.18	1.46	1.74

Dimensions of Standard Wrought Iron Pipe

We do not handle or quote prices on Pipe

Nominal Inside Diam. Inches	Actual Diameter Inches		Thickness Inches	Circumference Inches		Area Square Inches	
	Inside	Outside		Internal	External	Internal	External
⅛	.27	.4	.07	.84	1.27	.06	.12
¼	.36	.54	.08	1.14	1.69	.1	.22
⅜	.49	.67	.09	1.55	2.12	.19	.35
½	.62	.84	.10	1.95	2.65	.3	.55
¾	.82	1.05	.11	2.58	3.29	.53	.86
1	1.04	1.31	.13	3.29	4.13	.86	1.35
1¼	1.38	1.66	.14	4.33	5.21	1.49	2.16
1½	1.61	1.9	.14	5.06	5.96	2.03	3.83
2	2.06	2.37	.15	6.49	7.46	3.35	4.43
2½	2.46	2.87	.20	7.75	9.03	4.78	6.49
3	3.06	3.5	.21	9.63	10.96	7.38	9.62
3½	3.56	4.	.22	11.14	12.56	9.83	12.56
4	4.02	4.5	.23	12.64	14.13	12.73	15.9
4½	4.5	5.	.24	14.15	15.7	15.93	19.63
5	5.04	5.56	.25	15.84	17.47	19.99	24.29
6	6.06	6.62	.28	19.05	20.81	28.88	34.47
7	7.02	7.62	.30	22.06	23.95	38.73	45.66
8	7.98	8.62	.32	25.07	27.09	50.03	58.42
9	9.	9.68	.34	28.27	30.43	63.63	73.71
10	10.01	10.75	.36	31.47	33.77	78.83	90.79
11	11.	11.75	.37	34.55	36.91	95.03	108.43
12	12.	12.75	.37	37.7	40.05	113.09	127.67

Capacities and Threads of Standard W. I. Pipe

Nominal Inside Diam. Inches	Length to Thread Inches	Length of Pipe Containing one Gallon Feet	Contained Pounds of Water per Lineal Foot	Nominal Inside Diam. Inches	Length to Thread Inches	Length of Pipe Containing one Gallon Feet	Contained Pounds of Water per Lineal Foot
⅛	9/32	336.6	.024	3½	1 1/16	1.95	4.285
¼	⅜	148.8	.044	4	1⅛	1.51	5.517
⅜	7/16	100.8	.082	4½	1¼	1.2	6.908
½	½	63.2	.132	5	1¼	.96	8.668
¾	9/16	36.1	.23	6	1⅜	.66	12.521
1	⅝	22.3	.373	7	1½	.49	16.79
1¼	11/16	12.8	.648	8	1⅝	.38	21.688
1½	13/16	9.4	.883	9	1⅝	.3	27.58
2	⅞	5.7	1.454	10	1¾	.24	34.171
2½	1	4.02	2.072	11		.2	41.189
3	1	2 6	3.202	12		.17	49.017

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

Table of Mains and Branches

Main		Branch	
1 in.	will supply	2	¾ in.
1¼ in.	"	2	1 in.
1½ in.	"	2	1¼ in.
2 in.	"	2	1½ in.
2½ in.	"	2 1½ in. and 1 1¼ in., or 1 2 in. and 1	1¼ in.
3 in.	"	1 2½ in. and 1 2 in., or 2 2 in. and 1	1½ in.
3½ in.	"	2 2½ in. or 1 3 in., and 1 2 in. or 3	2 in.
4 in.	"	1 3½ in. and 1 2½ in., or 2 3 in. and 4	2 in.
4½ in.	"	1 3½ in. and 1 3 in., or 1 4 in. and 1	2½ in.
5 in.	"	1 4 in. and 1 3 in., or 1 4½ in. and 1	2½ in.
6 in.	"	2 4 in. and 1 3 in., or 4 3 in. or 10	2 in.
7 in.	"	1 6 in. and 1 4 in., or 3 4 in. and 1	2 in.
8 in.	"	2 6 in. and 1 5 in., or 5 4 in. and 2	2 in.

Weights

One Cubic inch of Cast Iron,	weighs	0.26	pounds.
One Cubic inch of Wrought Iron,	"	0.28	"
One Cubic inch of Water,	"	0.036	"
One U. S. Gallon,	"	8.33	"
One Imperial Gallon,	"	10.00	"
One U. S. Gallon,	equals	231.00	cubic inches.
One Imperial Gallon,	"	277.274	" "
One Cubic foot of Water,	"	7.48	U.S. gallons.
One Pound of Steam,	"	27.222	cubic feet.

Measure of Surface

144	sq. inches	=	1 sq. foot
9	sq. feet	=	1 sq. yard.
30¼	sq. yards	=	1 sq. rod.
40	sq. rods	=	1 rood.
4	roods	=	1 acre.
10	sq. chains	=	1 acre.
640	acres	=	1 sq. mile.

Measure of Solidity

1728	cu. inches	=	1 cubic foot.
27	cubic feet	=	1 cubic yard.

Liquid Measure

4	gills	make	1 pint.
2	pints	"	1 quart.
4	quarts	"	1 gallon.
31½	gallons	"	1 barrel.

Boiling Points of Various Fluids

Water in Vacuum	98°	Refined Petroleum	316°
Water, Atmosp'c Pres.	212°	Turpentine	315°
Alcohol	173°	Sulphur	570°
Sulphuric Acid	240°	Linseed Oil.	597°

Melting Points of Different Metals

Aluminum	1400°	Iron (cast)	2450°
Antimony	810°	Iron (wrought)	2912°
Bismuth	476°	Lead	608°
Brass	1900°	Platinum	3080°
Bronze	1692°	Silver (pure)	1873°
Copper	1996°	Steel	2500°
Glass	2377°	Tin	446°
Gold (pure)	2590°	Zinc	680°

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

Velocity of Flow of Water

In Feet per Minute, Through Pipes of Various Sizes, for Varying Quantities of Flow.

Gals. per Minute	¾ inch	1 inch	1¼ inch	1½ inch	2 inch	2½ inch	3 inch	4 inch
5	218	122½	78½	54½	30½	19½	13½	7⅔
10	436	245	157	109	61	38	27	15⅓
15	653	367½	235½	163½	91½	58½	40½	23
20	872	490	314	218	122	78	54	30⅔
25	1090	612½	392½	272½	152½	97½	67½	38⅓
30		735	451	327	183	117	81	46
35		857½	549½	381½	213½	136½	94½	53⅔
40		980	628	436	244	156	108	61⅓
45		1102½	706½	490½	274½	175½	121½	69
50			785	545	305	195	135	76⅔
75			1177½	817½	457½	292½	202½	115
100				1090	610	380	270	153⅓
125					762½	487½	337½	191⅔
150					915	585	405	230
175					1067½	682½	472½	268⅓
200					1220	780	540	306⅔

Number of Gallons in Tanks

Length or Depth in Feet	Diameter in Inches									
	18	24	30	36	42	48	54	60	66	72
2	26	47	73	105	144	188	238	294	356	424
2½	33	59	90	131	180	235	298	367	445	530
3	40	71	109	157	216	282	357	440	534	636
3½	47	83	127	183	252	329	416	513	623	742
4	54	95	145	209	288	376	475	586	712	848
4½	61	107	163	235	324	423	534	659	801	954
5	68	119	180	261	360	470	593	732	890	1060
5½	75	131	200	287	396	517	652	805	979	1166
6	82	143	217	313	432	564	711	878	1068	1272
6½	89	155	235	339	468	611	770	951	1157	1378
7	96	167	253	365	504	658	829	1024	1246	1484
7½	103	179	271	391	540	705	888	1097	1335	1590
8	110	191	289	417	576	752	947	1170	1424	1696
8½	.....	203	307	443	612	799	1006	1243	1513	1802
10	.....	239	361	521	720	940	1183	1462	1780	2120
12	.....	287	433	625	864	1128	1419	1754	2136	2544
14	.....	.....	.....	.....	1008	1316	1655	2046	2492	2968
16	.....	.....	.....	.....	1152	1504	1891	2338	2848	3392
18	.....	.....	.....	.....	...	.....	2127	2630	3204	3816
20	.....	.....	.....	.....	.....	.....	2363	2922	3560	4240

NOTE.—Above information is quoted from standard authorities. Not guaranteed.

Specific Heat of Bodies

Material	Specific Heat		Authority
Cast Iron	.12983		Regnault
Wrought Iron	.11379		"
Lime	.09555		"
Copper	.09515		"
Brass	.09391		"
Silver	.05701		"
Tin	.05695		"
Mercury	.03332		"
Gold	.03244		"
Platina	.03243		"
Lead	.03140		"
Bismuth	.03084		"
Nickel	.1086		"
Ice	.504		Person
Coal	.2777		Crawford
Coke	.20085		Regnault
Glass	.19768		"
Burnt Clay	.185		Gadolin
Brickwood	.200		"
Water at 32 degrees	1.000		
Alcohol (Sq. .793)	.622		Dalton
Ether (Sulphuric)	.477	.322	Regnault
Oil of Turpentine	.472		Despretz
Petroleum	.434		Regnault
Olive Oil	.3096		Lavoisier
Air	.237		
Saturated Steam	.305		

Specific Gravity of Different Bodies

To find the weight of a body, determine its cubical contents and multiply its Specific Gravity by the weight of a like volume of water.

Body	Specific Gravity	Weight per cu. ft. in pounds
Water	1.00	62.5
Aluminum	2.50	156.3
Tin (cast)	7.29	455.6
Steel	7.84	490.0
Cast Iron	7.21	450.0
Wrought Iron	7.68	480.0
Brass	8.38	523.8
Copper	8.79	549.4
Lead (cast)	11.35	709.4
Mercury	13.60	850.0
Platinum	21.50	1343.8

NOTE.—Above information is quoted from standard authorities. Not guaranteed,

According to Heine's analysis, the stated fuel values run as follows:

State	Brand	B. T. U., Per Lb.
Arkansas	Coal Hill	11,812
	Huntington Co.	12,537
Illinois	Big Muddy	11,494 avg.
	Carterville	11,601 "
	Colchester	9,848
	" Slack	9,035
	Dunferline Slack	9,401
	Duquoin	10,710
	Glen Carbon	9,740 avg.
	Girard	10,111 "
	Heitz Bluff	10,454 "
	Hurricane	11,868
	Muddy Valley	11,718
	Oakland	10,395
	St. Clair	10,068 avg.
	St. John	9,797 "
	Streator	11,403
	Trenton	10,584
	Turkey Hill	11,255 avg.
	Vulcan	9,450
Indiana	Block	10,407
Indian Territory	Atoka	11,088
	Choctaw Nation	12,789
	McAllister	13,287
Iowa	Milwaukee Pea	10,240
	Good Cheer	8,702
Kentucky	Kanawha	13,345
Maryland	George's C'k Cumberland	13,700
Missouri	Bevier	9,890
	Elston	12,656
	Lump	9,414
New Mexico	Coal	11,756
Ohio	Hocking Valley	13,309
	Jackson Co.	11,600
Pennsylvania	Clearfield	14,000
	Youghiogheny	13,480
	Pittsburg Slack	11,739
Tennessee	Glen Mary	13,167
	Lump	12,215
Texas	Ft. Worth	9,450
	"	11,803
Virginia	Pocahontas	13,363
Washington	Carbon Hill	12,866
West Virginia	New River	13,374
	"	12,800

Chimney Flues

The selection of chimney flues for heating Boilers must depend upon the judgment of the Heating Engineer. No tabular statements can be guaranteed, but it is believed that the table herewith, of Prof. R. C. Carpenter, when used in connection with the size of smoke pipes given for each IDEAL Boiler, will very much assist the engineer in selecting flues.

It is necessary that area and HEIGHT, thickness of walls, general structure, and the position of the top outlet with reference to the building and other buildings near by should be carefully noted and observed in the selecting or building a flue.

The figures given under the varying heights of chimneys are diameter measurements in inches, or, the side of a square—the theory being that the spiral ascending column of smoke and gases will make a twelve by twelve inch flue no more extensive in practical working area than a twelve inch round flue. Rectangular shapes may be used if the area is equal and the difference in width and length are not extreme.

DIRECT RADIATION *		HEIGHT OF CHIMNEY FLUE					
Steam in Square Feet	Water in Square Feet	20 ft.	30 ft.	40 ft.	50 ft.	60 ft.	80 ft.
250	375	7 4	7.	6.7	6.4	6.2	6.
500	750	9.6	9.2	8.8	8.2	8.	6.6
750	1150	11.3	10.8	10.2	9.6	9.3	8.8
1000	1500	12.8	12.	11.4	10.8	10.5	10.
1500	2250	15.2	14.4	13.4	12.8	12.4	11.5
2000	3000	17.2	16.3	15.2	14.5	14.	13.2
3000	4500	20.6	18 5	18.2	17.2	16.6	15.8
4000	6000	23.6	22.2	20.8	19.6	19.	17.8
5000	7500	26.	24.6	23.	21 6	21.	19.4
6000	9000	28.4	26 8	25.	23.4	22.8	21.2
7000	10500	30.4	28.8	27.	25.5	24.4	23.
8000	12000	32.4	30.6	28.6	26.8	26	24.2
9000	13500	34.	32.4	30.4	28.4	27.4	25 6
10000	15000	37.	34.	32.	30.	28.6	27.

* NOTE.—When a considerable amount of INDIRECT radiation is to be used increased Boiler capacity is necessary and in many cases such demands require a larger chimney flue for same number of square feet of radiation used.

A Less Specific Rule for Chimney Flues

Herewith is a table of chimney flue sizes which is commonly used with good results. It does not take into consideration varying heights of stacks, but is said to be reliable in average conditions.

DIRECT RADIATION *		SIZE OF FLUE	
Steam in Square Feet	Water in Square Feet	Round	Square
250	400	8	8 x 8
300	500	8	8 x 8
400	700	8	8 x 8
500	850	10	8 x 12
600	1000	10	8 x 12
700	1200	10	8 x 12
800	1350	12	12 x 12
900	1500	12	12 x 12
1000	1700	12	12 x 12
1200	2100	12	12 x 12
1400	2400	14	12 x 16
1600	2700	14	12 x 16
1800	3000	14	12 x 16
2000	3400	14	12 x 16
2200	3700	16	16 x 16
3000	5100	16	16 x 16
3500	5900	18	16 x 20
5000	8500	18	16 x 20

* NOTE.—When a considerable amount of INDIRECT radiation is to be used, increased Boiler capacity is necessary and in many cases such demands require a larger chimney flue for same number of square feet of radiation used.

Telegraph Code

In writing a cipher message, please observe the following: First—Begin every cipher word with a *capital* letter. Second—Whenever a blank occurs in a sentence, the word or words supplying such blank must immediately follow the cipher word of the sentence.

Quotations and Correspondence

	Cipher Word
At what price and how soon can you furnish.	Quadrants
Quote best price on	Quadrate
Quote best price on square feet of standard (38-inch height) height of....Radiators.....	Quadrille
Wire reply quick...	Quadroon
Will wire you tomorrow morning.....	Quaffed
Have written	Quaggy
Answer by first mail	Quagmire
See our letter of .. giving full particulars....	Quaintly
Have received no reply from you to our letter of.	Quakingly
Referring to your telegram of.....	Quakerism
Referring to your letter of.....	Qualify
Referring to our telegram of.....	Quandary
Referring to our letter of.....	Quarried
Do not understand the meaning of.....	Quartette
Inclosure mentioned in your letter of...not received, mail same at once	Quantum
We quote you for immediate acceptance	Quash
F. O. B. factory and less the carload rate of freight to	Quaternion
F. O. B. factory and less carload rate of freight where same does not exceed fifteen cts. per hundred lbs	Quatrains
What is the carload freight rate to.....	Quavered
What is less than carload freight rate to.....	Quench
Best rate of freight quoted on carload is.....	Querist
Best rate of freight quoted on less than carload is	Quibbler
Will wire you freight rates soon as received...	Quietude

Quotations and Correspondence—Continued

Send us your large edition of Radiator Catalogue ..... Quilted
Mail us loose sheets showing.... Radiator, for attaching to our heating estimate..... Quotient

Orders and Shipments

	Cipher Word
Ship immediately	Obdurate
Ship by express	Obedient
Ship by freight	Obeisance
Ship by best route	Obelisk
Ship immediately and follow with tracer	Objective
Ship before present freight rates advance	Objurgate
Ship with draft and bill of lading attached	Oblate
Send us bill of lading covering our order (No...)	Obliquity
Enter order as per our inquiry of	Oblivion
Enter order at your quotation of	Obscurity
Ship by same route as our order (No. or date)	Observant
Will send shipping instructions by mail	Observer
Shipping instructions for our order (No. or date) are as follows	Obstacle
Ship what you can at once	Obstinacy
Cannot ship as per your order, but could ship immediately	Obstruent
Do not hold for other orders, but rush quickly as possible	Obtruder
Forward as small lot, unless you have carload going at once	Obtrusive
When can you make shipment?	Obviously
When will order (No. or date) be shipped	Opaque
When and by what route did you ship our order (No. or date)	Operas
Send tracer after our order (No. or date)	Operatics
Trace vigorously by wire our order (No. or date)	Ophidian
Add to our order (No. or date)	Opiate
Duplicate our order (No. or date)	Opium
You may substitute on our order (No. or date)	Opossum
Omit....from our order (No. or date)	Opposer
Hold for instruction order (No. or date)	Oppressor
Could ship immediately	Optative
Expect to make shipment	Optical
Your order (No. or date) was shipped	Optician
Give date or number of order referred to	Optimism

Orders and Shipments—Continued

Your order (No. or date) does not specify	Opulent
Change our order (No. or date) to read	Oracular
Referring to your order (No. or date)	Orators
Referring to our order (No. or date)	Orchards
Do not find any order from you (No. or date)	Orchestra

Table of Dates

In telegraphing dates, prefix the day of the month. For example: "Aronsberg" would mean "first day of January."

Date	Cipher Word	Date	Cipher Word
1st	Arons	17th	Elgin
2d	Arch	18th	Eaton
3d	Abbey	19th	Front
4th	Baron	20th	Glass
5th	Butch	21st	Grass
6th	Blake	22d	Hazel
7th	Bulls	23d	Lees
8th	Barro	24th	Lynx
9th	Chink	25th	Olden
10th	Clegg	26th	Oster
11th	Cake	27th	Pilot
12th	Cole	28th	Plump
13th	Dress	29th	Queer
14th	Devon	30th	Race
15th	Dunn	31st	Skunk
16th	Elsie		

Month	Cipher Word	Month	Cipher Word
January	Berg	July	Ham
February	Boro	August	Mont
March	Dorf	September	Shire
April	Dale	October	Ton
May	Field	November	Ville
June	Ford	December	Wood

Time

	Cipher Word		Cipher Word
1 day	Apple	2 weeks	Lemon
2 days	Apricot	3 weeks	Olives
3 days	Banana	1 month	Orange
4 days	Cherry	2 months	Peach
5 days	Citron	3 months	Pears
6 days	Dates	4 months	Plum
10 days	Figs	5 months	Quince
1 week	Grape	6 months	Tomatoes

Numerals

These figures may be used in giving quantities, order numbers, amounts in dollars, weights, car numbers, etc.

To make up a word above 99, use the code as follows: For example, 142 — 14 cet, 2 bef — "cetbef." Or, 1425 — 14 cet, 25 dlo — "cetdlo." Or, 14,254 — 14 cet, 25 dlo, 4 bot — "cetdlobot." Or, 142,547 — 14 cet, 25 dlo, 47 fod — "cetdlofod."

Or, say car number 100,009 — 10 cul, 00 ayd, 09 abu — "culaydabu."

	Cipher Word		Cipher Word		Cipher Word
0	Aeb	27	Dim	64	Hic
00	Ayd	28	Dys	65	Hob
01	Aux	29	Dni	66	Hue
02	Arg	30	Eic	67	Hey
03	Ame	31	Eat	68	Hak
04	Ano	32	Eub	69	Hyk
05	Aup	33	Ewe	70	Jim
06	Ado	34	Ens	71	Jut
07	Alm	35	Ebi	72	Jix
08	Ast	36	Ext	73	Jeb
09	Abu	37	Esi	74	Jyc
1	Buc	38	Efa	75	Jri
2	Bef	39	Emp	76	Jos
3	Bix	40	Fax	77	Jlo
4	Bot	41	Fit	78	Jak
5	Bal	42	Fub	79	Jab
6	Blu	43	Feg	80	Lin
7	Bri	44	Fri	81	Lam
8	Bum	45	Flo	82	Lux
9	Boj	46	Fys	83	Loy
10	Cul	47	Fod	84	Lek
11	Clu	48	Fam	85	Lud
12	Cam	49	Fik	86	Lyt
13	Cro	50	Gal	87	Loe
14	Cet	51	Gig	88	Lij
15	Cug	52	Gub	89	Lub
16	Cat	53	Ger	90	Mum
17	Cle	54	Gof	91	Mib
18	Cok	55	Gri	92	Mez
19	Cwo	56	Glu	93	Myt
20	Dam	57	Gyt	94	Max
21	Dri	58	Gum	95	Mok
22	Dup	59	Gnu	96	Muj
23	Det	60	Hyx	97	Mil
24	Dix	61	Hab	98	Mac
25	Dlo	62	Hel	99	Mep
26	Dox	63	Hum		

Inches

Inches	Cipher Word	Inches	Cipher Word
⅛	Inattentive	3	Irradiate
¼	Inactive	3½	Irrigate
⅜	Inability	4	Irruption
½	Inaction	4½	Irritant
¾	Inanity	5	Islands
1	Inaudible	5½	Isomeric
1¼	Inbreeds	6	Isolated
1½	Incarnate	7	Isthmus
2	Irksome	8	Itinerant
2½	Ironical		

Quantity

	Cipher Word		Cipher Word
200 sq. ft	Arabic	3,500 sq. ft	Armorial
300 sq. ft	Arbiter	4,000 sq. ft	Armpit
400 sq. ft	Arboret	5,000 sq. ft	Aromatics
500 sq. ft	Arcade	6,000 sq. ft	Arpeggio
600 sq. ft	Arcanum	7,000 sq. ft	Arquebuse
700 sq. ft	Archery	8,000 sq. ft	Arrayed
800 sq. ft	Ardency	9,000 sq. ft	Arrogant
900 sq. ft	Arena	10,000 sq. ft	Arrow
1,000 sq. ft	Argentine	12,000 sq. ft	Arsenical
1,200 sq. ft	Argosy	15,000 sq. ft	Arterial
1,500 sq. ft	Aridity	20,000 sq. ft	Artichoke
1,800 sq. ft	Armada	25,000 sq. ft	Articulate
2,000 sq. ft	Armature	30,000 sq. ft	Artificer
2,500 sq. ft	Arminian	40,000 sq. ft	Artillery
3,000 sq. ft	Armistice	50,000 sq. ft	Artisan

Heights

	Cipher Word		Cipher Word
13 -inch Ht	Headland	26 -inch Ht	Heptagon
14 -inch Ht	Hearken	27½-inch Ht	Heptarchy
15 -inch Ht	Heartless	28 -inch Ht	Heptachord
16 -inch Ht	Heather	30 -inch Ht	Herbage
18 -inch Ht	Heedful	31 -inch Ht	Heretic
19 -inch Ht	Heiress	32 -inch Ht	Heritage
20 -inch Ht	Helmet	33 -inch Ht	Heritable
21½-inch Ht	Helmsman	33½-inch Ht	Hermetic
22 -inch Ht	Helpmate	38 -inch Ht	Heroic
23 -inch Ht	Hemlock	39½-inch Ht	Hesperian
24 -inch Ht	Hempen	44 -inch Ht	Hessian
25 -inch Ht	Henchman	45 -inch Ht	Heterodox

Number of Sections

	Cipher Word		Cipher Word
2 Sections	Shackles	19 Sections	Sherry
3 Sections	Shadowy	20 Sections	Shielding
4 Sections	Shaggy	21 Sections	Shiftless
5 Sections	Shakerism	22 Sections	Shingles
6 Sections	Shallow	23 Sections	Shining
7 Sections	Shambles	24 Sections	Shipwreck
8 Sections	Shamrock	25 Sections	Shirkful
9 Sections	Sharpness	26 Sections	Shivering
10 Sections	Shattered	27 Sections	Shocking
11 Sections	Sheathe	28 Sections	Shoddy
12 Sections	Sheepfold	29 Sections	Shoggle
13 Sections	Sheepish	30 Sections	Shopworn
14 Sections	Shekel	31 Sections	Shopping
15 Sections	Shellac	32 Sections	Shoulder
16 Sections	Shepherd	33 Sections	Shouting
17 Sections	Sherbet	34 Sections	Shoveling
18 Sections	Sheridan	35 Sections	Showery

Supply Steam leg section for single pipe	Showman
Supply Steam leg section for double pipe	Shredded
Supply Steam leg section with both supply and return at bottom	Shrewish
Supply Hot-Water leg section	Shrieked
Blank leg section, Steam	Shrillness
Return Steam leg section	Shrinkage
Return Hot-Water leg section	Shrivel
Intermediate Steam section	Shrubbery
Intermediate Hot-Water section	Shunning
Middle Steam leg section	Shuttle
Intermediate Hot-Water leg section	Shyness

Tapping Instructions

	Cipher Word		Cipher Word
¾-in. single pipe	Tablature	2-in. single pipe	Tannery
¾ x ¾-in.	Tableau	Tapped at "A"	Tantalize
1 x ¾-in.	Taciturn	Tapped at "B"	Tapestry
1 x 1-in.	Tactician	Tapped at "C"	Tapioca
1-in. single pipe	Taffeta	Tapped at "D"	Tarpaulin
1¼ x ¾-in.	Taffrail	Tapped at "E"	Tartaric
1¼ x 1-in.	Taintless	Tapped at "F"	Tautology
1¼ x 1¼-in.	Tailoress	Tapped at "G"	Taxidermy
1¼-in. single pipe	Talisman	Tapped at "H"	Tiara
1½ x 1-in.	Talmud	Tapped at "P"	Thwarted
1½ x 1¼-in.	Tamarind	Tapped at "W"	Throttled
1½ x 1½-in.	Tandems	Tapped right-hand	Tibial
1½-in. single pipe	Tangency	Tapped left-hand	Ticklish
2 x 1½-in.	Tangling		

Tapping Instructions—Continued

	Cipher Word
Tapped for single pipe Steam as per list	Tidiness
Tapped for double pipe Steam as per list	Tidology
Tapped for top supply and bottom return on same end	Tillage
Tapped for top supply and bottom return on opposite ends	Timbrel
Tapped for both supply and return tappings at bottom of same end	Timidity
Tapped at extreme top of first section	Timorous
Tapped at extreme top of second section	Tincture
Tapped underneath radiator, bottom of first section	Tinkling
Tapped underneath radiator, bottom of second section	Tinseled
Tapped for ¼-inch air valves	Tipstaff
To have flush bushings	Tirade
To have eccentric bushings	Titanic
All to have detachable high legs, so that the distance from floor to center of supply tapping shall be....inches	Titmouse
All to have extra-high solid legs, so that the distance from floor to center of supply tapping shall be....inches	Titular

Style and Kind of Radiators

	Cipher Word
Ætna Flue Steam	Bachelor
Ætna Flue Water	Babyhood
Areal Sanitary Box-base No. 10 for Steam	Babblement
" " " " 15 "	Babbling
Astro Two-Column Steam	Babington
" " Water	Babillard
Buffalo Standard Single-Column Orna'l Steam	Babbitt
" " " " Water	Babbler
" " Two-Column Orna'l Steam	Backing
" " " " Water	Backset
" " " Plain Steam	Badness
" " " " Water	Baffler
" " Three-Column Orna'l Steam	Baggage
" " " " Water	Bagpipe
" " " Plain Steam	Balance
" " " " Water	Balcony
" " Four-Column Orna'l Steam	Ballade
" " " " Water	Ballast
Cardinal Indirect	Balloon
Circular for Water	Balmify
" Steam	Balneal

Style and Kind of Radiators—Continued

	Cipher Word
Colonial Wall, 5-ft., Vertical, Steam	Balloting
" " 5-ft., " Water	Balsams
" " 5-ft., Horizontal, Steam	Balsamic
" " 5-ft., " Water	Baluster
" " 7-ft., Vertical, Steam	Balustrade
" " 7-ft., Vertical, Water	Bamboos
" " 7-ft., Horizontal, Steam	Bamboozle
" " 7-ft., " Water	Banished
Colonial, 9-ft., Vertical, Steam	Banality
" 9-ft., " Water	Bandelet
" 9-ft., Horizontal, Steam	Bandfish
" 9-ft., " Water	Bandicoot
Corner for Water	Bandage
" Steam	Bandala
Curved for Water	Bandbox
" Steam	Bandeau
Detroit Dining Room Water	Bandore
" " " Steam	Banderole
Direct-Indirect for Water	Barbule
" " Steam	Bardish
Excelsior Indirect Water	Barilla
" " Steam	Barkery
" Junior Indirect Steam	Barmaid
Ideal for Steam	Barrack
Italian Ornamental Flue Box-base Water	Barrage
" " " " Steam	Barrier
" " " Water	Bartery
" " " Steam	Barwood
Italian Plain Flue Box-base Water	Baryphony
" " " " Steam	Baritone
" " " Water	Basanite
" " " Steam	Basaltoid
National Two-Column Direct-Indirect Water	Barytes
" " " Steam	Bascule
" " Water	Bashful
" " Steam	Basilar
" Four-Column Steam	Bassoon
" " Water	Bastile
" Single-Column Water	Batatas
" " Steam	Bateful
Peerless " Water	Battalia
" " Steam	Baubles
" Two-Column Water	Batting
" " Steam	Battled
" Three-Column Water	Battuta
" " Steam	Batture
" Four-Column Steam	Bavaroy

Style and Kind of Radiators—Continued

	Cipher Word
Peerless Four-Column Water	Baybolt
Perfection Ornamental Dining Room	Bayonet
" " Direct-Indirect Water	Beached
" " " Steam	Beamily
" " Water	Beardie
" " Steam	Bearing
Perfection Plain Steam	Beastly
" Pin Indirect, extra large, bolt and flange	Beatify
Perfection Pin Indirect, standard, bolt and flange	Beating
Perfection Pin Indirect, extra large, with right and left-hand threaded nipple connections	Beauish
Perfection Pin Indirect, standard size, with right and left-hand threaded nipple connections	Becloud
Premier Three-Column, Water	Beagle
" " Steam	Beaker
Primus Indirect	Bedagat
Rococo Ornamental Dining Room Steam	Bedding
" " " " Water	Bedpost
" " Direct-Indirect Water	Bedroom
" " " Steam	Bedwarf
" " Water, with right and left-hand threaded nipple connections	Beehive
Rococo Plain Water, with right and left-hand threaded nipple connections	Beeswax
Rococo Ornamental Water, with slip nipple connections	Beggary
Rococo Ornamental Steam, right and left-hand threaded nipple	Behemoth
Rococo Ornamental Steam, with right-hand threaded nipples	Beldame
Rococo Plain Steam	Belcher
Sanitary School Pin Indirect	Beleaguer
Stairway for Steam	Believer
Standard Pin Indirect, 12 sq. ft. per sec., Steam	Beloved
" " " 12 sq. ft. " Water	Belting
" " " 15 sq. ft. " Steam	Bending
" " " 15 sq. ft. " Water	Beneath
Sterling Indirect	Benefit
St. Louis Standard Single-Column Ornamental Steam	Benight
St. Louis Standard Single-Column Ornamental Water	Benison
St. Louis Standard Two-Column Ornamental, Steam	Bereave

Style and Kind of Radiators—Continued

	Cipher Word
St. Louis Standard Two-Column Ornamental, Water	Beseech
St. Louis Standard Three-Column Ornamental, Steam	Beslave
St. Louis Standard Three-Column Ornamental Water	Besmear
St. Louis Standard Four-Column Ornamental, Steam	Betulin
St. Louis Standard Four Column Orna'l, Water	Betrayal
" Window Steam	Bicched
" " Water	Bickern
Verona Water	Bicycle
" Steam	Bidental
Window Radiators for Water	Bifilar
" " Steam	Bigoted
Zenith Flue Steam	Biliary
" " Water	Bilious
" " Box-base Steam	Billiards
" " " Water	Billowy
" Window Steam	Biotaxy
" " Water	Bipolar

Radiator Miscellanies

	Cipher Word
Box-base with back opening, Detroit Plant	Machinate
" " bottom " " "	Madrigal
" " back " Titusville "	Madcaps
" " bottom " " "	Macrology
Brackets, No. J 1	Macerated
" No. J 2	Maceration
" No. J 3	Macrocosm
" No. K 1	Macrotous
" No. K 2	Maculate
" No. K 3	Maddened
" No. K 4	Maddening
" No. K 5	Madness
" No. K 6	Magazines
" No. L	Magically
" No. M	Magistracy
" No. N	Magisterial
" No. O	Magnesium
Bushings, 2 inches, reducing to 1½ inches	Magnate
" 2 " " 1¼ "	Magnetic
" 2 " " 1 inch	Magnolia
" 2 " " ¾ "	Mahogany
" Flush	Mahometan
" Eccentric	Majestic

Radiator Miscellanies—Continued

	Cipher Word
Carpet Feet, arranged with detachable	Malapert
Dampers, Floor	Malicious
Legs, fitted with detachable high; to make distance from floor to center of supply tapping .... inches	Malster
Legs, fitted with extra high solid; to make distance from floor to center of supply tapping .... inches	Mammal
Legs, fitted with detachable Carpet (legs or feet)	Mammoth
Nipples, 2 -inch right and left-hand threaded	Manacle
" 1½-inch " " " "	Mandarin
Nipples, 2-inch right and left-hand threaded, with hexagon nut at center	Mandatory
Nipples, 2-inch right-hand threaded	Manhood
" 2¼-inch slip	Manifesto
Pedestals . inches high	Manifold
Pedestals to make distance from floor to center of supply tapping ... inches	Mankind
Plugs, 2-inch	Mannerism
" 1½-inch	Manœuvre
" ⅛-inch Brass (for air-valve tapping)	Marauder
Saddles for marble tops	Marginal
Tops, fitted with lugs for marble	Marksman
" " " saddles for marble	Martingal
" cast-iron for Perfection Water Radiators	Massacre
" " " " Steam Radiators	Masticate
Wall Boxes, Detroit Plant	Matadore
" " Titusville Plant	Maternity
Wrenches for Detroit Plant Water Radiators	Maternal
" " " " Steam "	Matrimony
" " Indirect Radiators connected with right and left-hand threaded nipples having hexagon nut at center	Mattock

Ideal Sectional Boilers

Water		Steam	
Number	Cipher Word	Number	Cipher Word
512	Sobriquet	502	Solstice
612	Socialism	602	Solstotial
712	Societies	702	Solubility
184	Socketed	084	Solution
185	Socratism	085	Solutive
186	Sodality	086	Solvable
187	Sodomite	087	Solvency
W-21-5	Soulless	S-21-5	Sparkle
W-21-6	Sourness	S-21-6	Speaker
W-21-7	Sovereign	S-21-7	Specific

Ideal Sectional Boilers—Continued

Water		Steam	
Number	Cipher Word	Number	Cipher Word
245	Softness	045	Sombrous
246	Soirees	046	Somnolence
247	Sojourned	047	Sonatas
248	Solaces	048	Songsters
W-30-5	Sophistry	S-30-5	Sorcerous
W-30-6	Soporous	S-30-6	Sordidly
W-30-7	Soporific	S-30-7	Sorghums
W-30-8	Sopranos	S-30-8	Sorrowful
365	Soldiering	065	Soloists
366	Solecism	066	Sonneteer
367	Solemnity	067	Sonorous
368	Solenoid	068	Soother
369	Solicitude	069	Sophisms

Ideal Sectional Coke Boilers

Water		Steam	
Number	Cipher Word	Number	Cipher Word
W-2-4	Saltish	S-2-4	Satiate
W-2-5	Saltpetre	S-2-5	Satirize
W-2-6	Salutory	S-2-6	Saturate
W-2-7	Salute	S-2-7	Sauciness
W-3-5	Sameness	S-3-5	Saunter
W-3-6	Sanative	S-3-6	Savage
W-3-7	Sanctify	S-3-7	Savant
W-3-8	Sanders	S-3-8	Savory
W-4-5	Sanguine	S-4-5	Scabbard
W-4-6	Sapidity	S-4-6	Scaffold
W-4-7	Sapless	S-4-7	Scallop
W-4-8	Sapphire	S-4-8	Scamper
W-5-5	Saracen	S-5-5	Scatter
W-5 6	Sarcasm	S-5-6	Scenery
W-5-7	Sardine	S-5-7	Sceptical
W-5-8	Satanic	S-5-8	Scholastic
W-5-9	Satelite	S-5-9	Scientific

Sectional Tank Heater

Number	Cipher Word
1-4	Jolliness
1-5	Joviality
1-6	Joyancy
1-7	Journalist

Junior Boilers

Water		Steam	
0	Jubilant	201	Jurists
10	Jubilee	301	Justices
11	Judaism	302	Juvenile
12	Judgment		
20	Judicial		
21	Jugglers		
22	Jugular		
30	Juiciness		
31	Juncture		
32	Juniper		
33	Jupiter		

Premier Junior

101	Kangaroo
121	Keelsons
122	Kennels
151	Ketchup
152	Kinology
181	Kiosks

Premier Boilers

For Soft Coal

Steam		Water	
Number	Cipher Word	Number	Cipher Word
B 015	Weakened	B 152	Wearily
B 018	Wealthy	B 182	Weathered
B 021	Weazened	B 212	Whimsical
B 022	Weighable	B 213	Whipstaff
B 025	Welfare	B 242	Whittles
B 026	Wellbred	B 243	Wholesome
B 028	Wheatened	B 282	Willfully
B 029	Wheedles	B 283	Windfall
B 032	Whetstone	B 322	Windlass
B 033	Whiffle	B 323	Windburst

For Hard Coal

Steam		Water	
Number	Cipher Word	Number	Cipher Word
A 015	Winterly	A 152	Witticism
A 018	Wishbone	A 182	Womanhood
A 019	Wistfully	A 183	Womankind
A 020	Wonderful	A 213	Wretchedly
A 021	Wonderment	A 212	Wristband
A 022	Wondrous	A 213	Wryness
A 024	Wondrously	A 241	Wringers
A 025	Woodbine	A 242	Wrinkled
A 026	Woodchuck	A 243	Workmanly
A 027	Woodcraft	A 281	Workshop
A 028	Worshipful	A 282	Worldling
A 029	Worsteds	A 283	Worldly
A 031	Wrangler	A 321	Worrier
A 032	Wrathfully	A 322	Woolgrower
A 033	Wretched	A 323	Wooliness

Portable Boilers

Water		Steam	
Number	Cipher Word	Number	Cipher Word
13	Preamble	103	Pressman
14	Precepts	104	Prestige
15	Precinct	203	Pretence
24	Precious	204	Pretext
25	Precipice	205	Prevails
26	Precision	303	Prickled
34	Preclude	304	Priestly
35	Pfecocity	305	Primary
36	Preface	403	Primness
37	Pregnable	404	Princess
44	Prejudice	405	Prioress
45	Prejudge	504	Prisoner
46	Prelates	505	Pristine
47	Premium	506	Prismatic
55	Premonish		
56	Presbyter		
57	Prescient		
58	Presents		

Invincible Boilers

Water		Steam	
Number	Cipher Word	Number	Cipher Word
120	Indignant	113	Incased
130	Indiscreet	114	Incense
230	Indocility	223	Inception
240	Inefficacy	224	Incessant
330	Infringes	225	Incident
340	Ingenuity	333	Incipient
430	Ingrained	334	Incisive
440	Ingredient	335	Inclement
450	Injunctions	443	Inclined
530	Innocence	444	Incrusted
540	Innovation	445	Incubate
550	Inordinate	554	Incumbent
		555	Incursion
		556	Incurvity

Arco Boilers

Water		Steam	
Number	Cipher Word	Number	Cipher Word
1-19-W	Lancinate	1-19-S	Laborious
2-19-W	Landloping	2-19-S	Labyrinth
1-22-W	Lapidary	1-22-S	Lacerated
2-22-W	Lassitude	2-22-S	Lackaday
1-25-W	Lastingness	1-25-S	Lamantine
2-25-W	Laudatory	2-25-S	Lamella
1-28-W	Laureate	1-28-S	Lamentable
2-28-W	Lawfulness	2-28-S	Laminated

Water Michigan Boilers Steam

Number	Cipher Word	Number	Cipher Word
3	Mobility	4	Monasteries
5	Mockeries	8	Monograms
9	Moderately	12	Monologue
17	Modernize	16	Monotonous
21	Modesty	20	Monopolized
25	Modulated	24	Monstrously
29	Mohammedan	28	Monumental
35	Moistness	34	Morocco
37	Molasses	36	Morphine
107	Moldiness	110	Morsels
115	Molecular	114	Mortality
119	Mollify	118	Motionless
123	Molluscan	122	Mountains
127	Momentary	126	Mountings
133	Monarchical	132	Movements

Fire Box Boilers and Parts

	Cipher Word
Acme Fire Box only	Fibrillar
" " " Boiler with castings	Fickleness
" " " " " and steam trimmings	Fictitious
Ideal Return Flue Boiler only	Factotum
" " " " with castings	Faculty
" " " " " and steam trimmings	Fadeless
Ideal Return Flue Boiler, size 1200	Fiddler
" " " " " 1500	Fidgets
" " " " " 1800	Figgots
" " " " " 2100	Fighting
" " " " " 2600	Fireman
" " " " " 3000	Figwort
" " " " " 3500	Fitfully
" " " " " 4500	Fisherman
Tapped for Steam	Fidelity
" " Water	Fiducial
Front Arch Plate for Acme Fire Box Boiler, (No....)	Fiendishly
Rear Covering Plate and Slide Damper	Figmental
Steam Trimmings, complete	Filaments
Compression Valves, ⅜-inch	Filanders
Damper Regulator, complete	Filchings
Safety Valve (.... inches)	Filiation
Steam Gauge	Filibuster
Water Column Casting	Filigree
" " complete	Filtering
Fire Door and Frame	Fringed
Ash-Pit Front	Friskers
Large Soot Door	Frittered

Fire Box Boilers and Parts—Continued Cipher Word

Small Soot Doors ..... Frolicer
Acme Shaking Grates ..... Frontier
To contain (....) Tubes, instead of regular.... Fructify

Valves, Specialties, Etc. Cipher Word

Air Valves, Compression, Wood Wheel, O.S. No. 3. Reaction
" " " Improved Wood Wheel No. 3. Reappear
" " " Key, O. S. No. 4..... Reapers
" " " Improved Key, No. 4. Rebelled
" " Imperial Automatic ..... Rebounded
" " " " Lock and Shield. Rebuffed
" " " " Straight Shank. Rebuilded
" " Libra Automatic..... Rebuking
" " Morgan Vacuum..... Recapture
" " Russell Automatic..... Recasts
" " Spring, Self Closing ..... Reception
" " Victor Automatic, No. 1..... Recession
" " " " No. 2..... Rechoose
Asbestos Covering, Molded (....feet of)..... Recipes
" Cement, Plastic (....pounds of)..... Recipient
Asphaltum, Black (.. gallons of)..... Recitals
Auxiliary Water Heater..... Reckless
Boiler Feeder, Automatic. ..... Recitation
Bronze, Pale Gold (....pounds of) ..... Reckoned
" Rich " (.. " ") ..... Reckoning
Bronzing Liquid (....cans of) ..... Reclaimed
Brushes, Radiator ..... Recoined
Cement, Plastic Asbestos (. pounds of).... Recognized
Covering, Wool Felt, Molded (....feet of).... Recondite
" Asbestos Molded (....feet of). ... Reconnoiter
Diaphragm, Rubber, ... Recorders
Distributers, O. S. (No ..)..... Rectitude
Elbows, Union (No....)..... Rectory
Enamel (cans of)... ..... Recuperate
Floor and Ceiling Plates, Ajax, black.... .. . Recurrency
" " " Imperial..... Recusant
" " ' Russell, N. P. ..... Redolence
" " " Worcester, N. P. .... Redressed
" Plates, Ideal Solid Steel ..... Re-echoed
" " B. & C., black. ..... Recrement
" " " N. P. ... . Recreative
Ceiling " " black ..... Recruitment
" " " N. P. ..... Rectangles
Gauges, Steam..... ..... Reelection
" Altitude ..... Refectory
Japan, Maroon (....cans of)..... Refinement
Marble Tops for Radiators, Tennessee .. .... Reflection
Marble Tops for Radiators, Italian ..... Refluxing
O. S. Distributers (No ..) ..... Refractory
Putty for Boilers (....lb. can) .... Regiments

Telegraph Code—Continued

Valves, Specialties, Etc.—Continued	Cipher Word
Registers, Japanned, black	Registers
" " N. P.	Rehearsal
" Plated	Reiterate
Regulators, Powers' (No...)	Relapse
Shields, Ideal (Pattern No. 1)	Relentless
" " (" No. 2)	Religion
Tank Regulator, No. 1	Relevant
" " No. 8	Relining
Tanks, Expansion, Galvanized Steel (No...)	Relinquish
" " (No....) with Trimmings	Reluctant
" " Automatic, Wood Case, (No..)	Remedies
Tanks, Extra Heavy, Black Steel, Horizontal (....gallons)	Remittal
Tanks, Extra Heavy, Black Steel, Vertical, (....gallons)	Remissible
Tanks, Storage, Black Steel, Horizontal (.... gallons)	Remission
Tanks, Storage, Black Steel, Horizontal (with black pipe coil) (....gallons)	Remiss
Tanks, Storage, Black Steel, Horizontal (with galvanized pipe coil) (....gallons)	Remorse
Tanks, Storage, Black Steel, Vertical (.... gallons)	Remorseful
Tanks, Storage, Galvanized, Horizontal (.... gallons)	Renounce
Tanks, Storage, Galvanized, Vertical (..gallons)	Renowned
Thermometers, Straight	Reorganize
" Angle	Repairs
Traps, Steam, Nason (No....)	Reparation
Valves, Check, No. 741, Brass	Reprieved
" Gate, No. 335, Iron Wheel, Brass	Reprimand
" " No. 373, Wood " " Union	Republican
" Globe, No. 178, Iron "	Requisite
" " No. 189, Wood, " Union	Rescuers
" Hot Water, Bonnetless, Quick-Opening (No...)	Residence
Valves, Hot Water, Bonneted, Quick-Opening (No....)	Resistance
Valves, Hot Water, Straightway, Quick-Opening (No...)	Resolution
Valves, Pressure-Regulating, Ideal	Retrospect
" Steam, Angle, Screw-Stem, with Jenkins Discs (No ...)	Revengeful
Valves, Steam, Angle, Screw-Stem, with Brass Discs (No....)	Revenged
Valves, Steam, Angle, Quick-Opening (No....)	Revolting
" " Corner, Screw-Stem (No....)	Revolver
" to be equipped with lock and shield	Revolution
Wool Felt Molded Covering (....ft. of)	Reviewers

Rogers & Company, Engravers and Printers, Chicago.

AMERICAN & IDEAL

RADIATORS BOILERS